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ALERT NO. 94
MAY 1986

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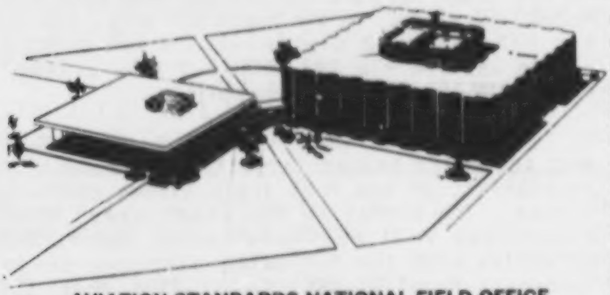
AC 43-16

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C. 20590

GENERAL AVIATION AIRWORTHINESS ALERTS

MAY 1986



AVIATION STANDARDS NATIONAL FIELD OFFICE
MIKE MONRONEY AERONAUTICAL CENTER

The General Aviation Airworthiness Alerts provide a common communication channel through which the aviation community can economically interchange service experience and thereby cooperate in the improvement of aeronautical product durability, reliability, and safety. This publication is prepared from information submitted by those of you who operate and maintain civil aeronautical products. The contents include items that have been reported to be significant, but which have not been evaluated fully by the time the material went to press. As additional facts such as cause and corrective action are identified, the data will be published in subsequent issues of the Alerts. This procedure gives Alerts readers prompt notice of conditions reported via Malfunction or Defect Reports. Your comments and suggestions for improvement are always welcome. Send to: Aviation Standards National Field Office, Attn: AVN-110, P.O. Box 25460, Oklahoma City, Oklahoma 73125.

AIRCRAFT

AEROSPATIALE

Aerospatiale Model AS-355F1	Oil Return Tube P/N 355A53-0500-159	The left oil return tube from the tank to the cooler had a hole chafed on the lower side due to contact with the deck. The hole was located at approximately the midpoint of the tube length. The major length of this tube passes through the cooling tunnel and cannot be inspected thoroughly unless the fan and duct are removed. The replacement tube was spiral wrapped to prevent this from occurring again.

NOTICE TO READERS: The General Aviation Airworthiness Alerts are, for the most part, prepared from information supplied by those who operate and maintain aircraft. The FAA encourages the reporting of all malfunctions or defects that come to the attention of service or operating personnel, even though the problem has been previously reported. The Malfunction or Defect Report, FAA Form 8010-4, which supersedes FAA Form 8330-2, is available from the local General Aviation District Office, and may be used for reporting purposes.

BEECH

Beech Models 95-B55 E55, 58, 58TC and 58P	Janitrol Heater Drain Elbows	Recent reports from the field indicate some heater combustion chamber fuel drain elbows have been found cracked, corroded, and even totally clogged. Beech recommends the P/N MS20822-5D elbow (90 degrees) located at the lower aft side of the heater be replaced with a P/N MS20822-5J elbow, and the P/N MS20823-5D elbow (45 degrees) located at the lower forward side be replaced with a P/N MS20823-5J elbow. On the Model 58P only, replace the P/N AN816-4D nipple with a P/N AN816-5J nipple and the P/N 102-550048-3 tube assembly with a P/N 102-550048-39 assembly. It is recommended these changes be made at the next scheduled heater inspection to reduce the possibility of the fuel drain elbows corroding closed. The corrosion resistant steel drain assemblies will be installed at the factory effective with the following airplane serial numbers: Model 95-B55, S/N TC-2394, Model E55, S/N TE-1191; Model 58, S/N TH-1260; Model 58TC, S/N TK-142; and Model 58P, S/N TJ-367. NOTE: Above article was published in Alerts No. 46 dated May 1982. There was a recent report of an aluminum drain found corroded and plugged on a Beech 95-B55.

CHAMPION

Champion Aeronca Model 11AC	Gear Bolts	The maingear bolts were found worn and corroded during an annual inspection. Inadequate lubrication was the cause of the wear, corroion, and frozen bushings. The submitter recommends the maingear attachment bolts be removed, inspected, and lubricated at least annually.

CESSNA

Cessna Model 152	Starter Contactor P/N S-M55-A1	The starter did not release upon engine start and was destroyed. The only indication of a hung starter was a higher than normal alternator charge rate which may not be noticed by student or low-time pilots. The submitter had replaced three ruined starters in recent weeks, because the contactor failed to release following start. This reported contactor had 200 hours total time.

Cessna Model 172RG	Carburetor Airbox	The engine experienced a loss of power during cruise. There was no r.p.m. drop when the carburetor heat was pulled. Investigation disclosed the airbox valve hinge welds were cracked, and the valve would open and close without control movement. The submitter recommends heavier hinge assemblies be installed on airboxes as this was the second failure in 905 operating hours.
Cessna Model 182C	Engine Mount Bushing P/N 0550155	A knocking sound in the lower footwell area was observed when changing throttle setting at low engine r.p.m.. Investigation revealed the lower engine mount tube to firewall rubber bushing was broken, and the inboard pad was missing. This allowed the mount to move against the firewall. The submitter recommends replacing the firewall rubber mounts along with the engine rubber mounts at engine overhaul. Time on the parts - 3,205 hours.
Cessna Model TU206E	Trim Tab Link P/N 1260065-8	There was momentary loss of nose down trim during climb. Investigation revealed the trim tab link assembly broke at the aft rivets. Corrosion caused the link to freeze to the horn bracket on the trim tab. The bushing was corroded at the attaching point making movement impossible. The submitter recommends an inspection of the area for corrosion and bushing lubrication each month.
Cessna Model 208	Spring Pin P/N 8775-0028	The aileron controls locked in a left turn requiring considerable force to override the lockup. After breaking free, the roll function of the autopilot was inoperative. Investigation disclosed the spring pin that ties the actuator to the autopilot servo had split, then worked out and caught in the capstan. Inspection of another aircraft revealed the spring pin was missing and was found on the bottom of the gear cover.
Cessna Model T303	Elevator Torque Tube Bolts	During a routine inspection, the three AN4-7A bolts that attach the elevator torque tubes to the elevator control arm were found loose. The bolts were inspected and properly torqued. This condition was found on two low-time aircraft.
Cessna Model T303	Vertical Fin Bolts P/N AN5-6A	Seven of eight vertical fin bolts were found loose. The bolts were re-torqued to the proper value and torque seal applied. The submitter recommends inspection of the bolts each 100 hours. There were two similar reports on low-time aircraft. Vibration during flight was listed as a probable cause for the loose bolts.

WHEN EVEN THE SLIGHTEST DOUBT EXISTS - VERIFY

Cessna Model 310Q	Nose Gear Idler Bellcrank	The nosegear failed to entend for landing. Investigation disclosed the idler bellcrank had fractured at the pivot boss which limited movement of the push-pull tube. Time on this part was 1,458 hours. There was another report on a Cessna 310R with 947 hours. This operator has established a replacement schedule of 500 hours as he has experienced three recent failures of the idler bellcrank.
Cessna Model 402A	Flap Cable P/N 5000008-4	The right flap extend cable broke while the aircraft was on short final. Landing was accomplished with no other problems. Probable cause was numerous short flights and aircraft time of 10,200 hours. There was another report of the left cable breaking on short final on an aircraft with 10,400 hours. The submitter recommends a thorough inspection of the flap cables at the first outboard pulleys in both retracted and extended configurations.
Cessna Model 421C	Hinge Bracket	During annual inspection, the elevator hinge brackets were replaced with newer type steel brackets instead of the original aluminum parts. After the aircraft was flown, it was reported that there was an 87° error in the slaved gyro system. Subsequent investigation showed that the middle hinge bracket and hinge bolt were both magnetized on the left hand side. This hinge is less than 12 inches from the flux detector. Later serial numbers of 421C aircraft have the flux detector relocated to the forward part of the vertical stabilizer. The latest parts manual shows the steel hinges applicable to all serial numbers. After extensive experimentation using temporary mountings, it was determined that the best location for the flux detector on this aircraft would be in the tailcone at a point approximately 289 inches aft of the datum and 109.9 above W.L. A permanent mount was fabricatead and the flux detector installed. After adjustinging on the ground, the aircraft was test flown and slaved gyro operation was normal.
Cessna Model 441	Hot Wires	Avionics wiring between fuselage stations 100 and 130 was found with burned and melted insulation. The damage resulted from being secured to bleed air tubing. The submitter recommends warning placards near the tubing to advise avionics installers not to secure wiring to the tubing.
Cessna Model 550	Hydraulic Line P/N 5517010-13	Left brake pressure was lost on the copilot's side during maintenance bleeding of the brakes. Brake fluid spewed from under the pilot's instrument panel. Investigation disclosed the hydraulic crossover line had been cut by a rudder cable. The new line was positioned to prevent contact with the rudder cable. Inspection of this area behind the instrument panel is difficult and hampered by a metal cover plate.

Cessna Model 650	Aircraft Wiring	The flap inoperative light would illuminate during flight. This always occurred with the flaps in the up position. The problem could not be duplicated on the ground. Finally, after 50 hours of troubleshooting, pin "B" was found not locked in the JT114 plug. Operation was normal after pushing pin "B" into plug JT114.
Cessna Model 650	Vent Line	A problem with fuel imbalance during flight was corrected by removing the shipping plugs from the left fuel tank vent line. There was a report of finding a cloth rag and a rubber plug in the right wing vent system in another Cessna 650.

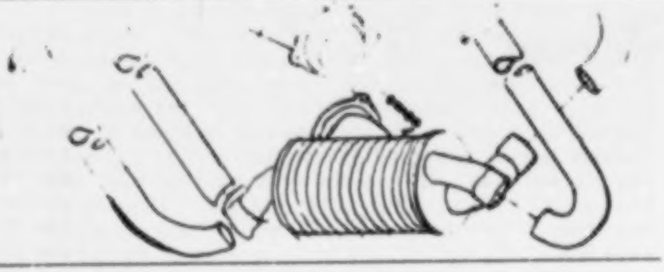
GATES LEARJET

Gates Learjet Model 25D	Flap Sector Bracket P/N 2322516-168	The end of the right flap sector bracket assembly was found broken. This bracket broke within 400 operating hours. Steel brackets (P/N 2322516-213 and 2322516-214) were installed on the aircraft. The submitter advised that these brackets were not a problem on the 23 and 24 model Learjets, but is a problem on the 25, 35, and 55 models.
Gates Learjet Model 35A	Flap Sector Bracket P/N 2322516-167	The flight crew reported a roll to the left when moving the flaps from 8° to 20°. Investigation revealed the left flap sector upper bracket was broken causing the sector to pitch forward. The replacement part was manufactured out of a steel alloy, which was not identified by Service Bulletin 35/36-27-15A. The submitter suggests that Gates Learjet should require replacement of the brackets with the new steel type.

MOONEY

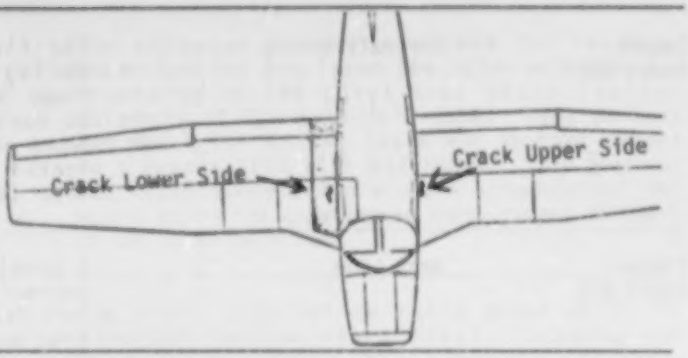
Mooney Model M20J	Muffler P/N 630045-503

A repair station found five mufflers with burned out flame tubes in a 1-month period. One muffler had a hole burned through the outside ribbing. These mufflers were on 1976 through 1980 Model M20 aircraft.



PIPER

Piper Model PA-28 Series	Gear Bolts	The main landing gear attaching screws and bolts were found loose during an annual inspection. This condition was found on five separate aircraft. The submitter recommends these screws and bolts be checked during each annual inspection.

Piper Model PA-28-161	Skin Cracks	The left wing top skin had a 6-inch crack at the root end. The crack was partially hidden by the rubber molding. The right wing lower skin had a 6-inch crack approximately 3 inches outboard from the fuselage. Very similar cracks were found on a second PA-28. Aircraft times were not given. 
Piper Model PA-28-161	Starter Problems Model MZ4222	The starter bendix shaft was found severely worn. The worn shaft, or similar starter problems, have been found on 10 of 11 new aircraft received from August to November 1984. The submitter suspects the shaft was not properly hardened, or the starter was not properly shimmed during factory installation, or a combination of both. Starter times were from 50 to 350 hours. NOTE: This article was published in Alerts No. 81 dated April 1985. Reports of the problems continue to be received on low-time starters.
Piper Model PA-28RT-201T	Retract Cylinder Bolts	The nosegear retract cylinder attach bolts have been found bent, broken, and severely worn on the operator's training aircraft. The submitter suggests a time or cycle limit be established for the bolts. Time on these reported bent and worn bolts - 591 hours.
Piper Model PA-31-350	Seeping Fuel Line P/N 39997-09	The steel braided line from the boost pump to the firewall shutoff was found seeping fuel through the braid. The leak was found by moving the line with the boost pumps on. There had been previous complaints of fuel fumes in the cabin while the aircraft was on the ground, and the boost pumps were on.
Piper Model PA-31T1	Heater Liner P/N 62D33-2	The pilots were having headaches and feeling ill after flying the aircraft. While the aircraft was in for an inspection, it was decided to comply with the heater inspection in accordance with Airworthiness Directive 82-07-03, even though the inspection was not due for another month. Inspection disclosed the heater combustion liner had a 4-inch crack in the center. The heater had been in service 90 hours since overhaul.
Piper Model PA-42-1000	Gear Brace Link P/N 75245-10 and -11	The left maingear side brace was found broken after the aircraft was towed into a hangar. Inspection of the right side revealed the brace was cracked. The aircraft had a total of 728 landings. The submitter suspects the links are inadequate for the lengthened gear on this prototype model.

Piper Model PA-46-310P	Elevator Trim Tubes	The elevator trim tab push-pull tubes were found rusted severely on a low-time aircraft. The submitter recommends the exposed area of the tubes be primed and painted with rust resistant paint.
Piper Model PA-46-310P	Engine Rubber Mount	The front left rubber engine mount was found deteriorated from exhaust heat. The submitter recommends a heat shield. Airframe and engine total time - 145 hours.
Piper Model PA-60-600 Series	Maingear Torque Links	

A search of the service difficulty data revealed 23, PA-60 airplanes had experienced difficulties related to the main landing gear torque links. Of these 23 reports, 11 were received in the last 6 months signifying a definite upward trend of reporting. Most reports cited the male lug of the link cracked or broken in the area of the .250 inch radius.

Airworthiness Directive (AD) 80-02-09 effective January 21, 1980, and Piper Service Bulletin 746 dated September 9, 1982, were issued to correct the main landing gear torque link breakage problem. This AD and service bulletin called for replacement of the old style links, P/N 400076-501, which have a .130 inch radius on the male lug, with P/N 400076-1 or 400076-503 which have a .250 inch radius at the male lug. This larger radius on the torque link lug would supposedly alleviate the problem of breaking torque links.

A review of the data revealed one accident and five incidents attributed to the main landing gear torque links breaking. These accident/incident reports and their related service difficulty reports citing the new torque link as broken, were processed in 1982, 1983, 1984, and 1985. This signifies the problem has not been alleviated completely.

Articles have been published in Alerts addressing the problem of torque link breakage. These articles were published September 1983, May 1984, December 1984, and February 1986.

Piper Model PA-60-601P	Exhaust Weld Assembly	The pilot experienced an in-flight fire minutes after takeoff. The turbo controller wire harness and all hoses and control cables in the wing and wing root area were destroyed. The firewall remained intact, but flames spread around the firewall and burned through the fiberglass fairings. The spar behind the firewall melted, exposing fuel vent lines and a main fuel supply hose to the heat, which melted the vent lines and charred the fuel hose. The fuel hose held but was 50 percent burned through. The fire burned through to the intercooler bay and exited through the leading edge skin inboard of the nacelle and gear well area. The left engine outboard tailpipe had cracked 360° around the flange and rotated down exposing the firewall to exhaust gasses. The tailpipe clamp remained intact holding the flange to the turbocharger. The submitter suggests a retaining device to prevent the tailpipe from rotating should it separate from the flange. This tailpipe system had been inspected 45 hours prior to failure. NOTE: Related article was published in Alerts No. 91 dated February 1986.

BENDIX

Bendix **Magnetos**

There have been numerous Service Difficulty Reports concerning Bendix Magnetos; for example, the 2-year history (ending 6/6/85) reflected the following trends for Teledyne Continental Engines only. Magnetos used on Lycoming engines should be inspected for similar problems.

REPORTED CONDITIONS

PART NO.	NAME	QUANTITY	CONDITIONS
10-52949	Dist. Block	10	Cracked (7) Bushing worn (2) Arcing (1)
10-52958	Dist. Block	15	Cracked (12) Bushing worn/loose (4)
10-382896	Dist. Gear	12	Teeth stripped/sheared (6) Electrode finger loose (6)
10-157197	Dist. Gear	12	Bearing worn/loose (10) Teeth stripped/sheared (2)
10-391088	Coil	13	Cracked/leaking (13)
10-382972	Dist. Block	9	Cracked (9)
10-50746Y	Dist. Gear	11	Electrode loose (5) Teeth broken/stripped (6)
10-3493943	Magneto Hsg.	21	Cracked (21)

ANALYSIS OF REPORTS

The text for the reported conditions include: misfiring, backfiring, loss of power, roughness, excessive cylinder temperature, excessive EGT, forced landing, failed in flight, radio noise, and roughness during climb out.

FACET AEROSPACE PRODUCTS CO.

Facet (Marvel Schebler) Carburetors **Molded Cellular Floats**

The engine in a PA-22 aircraft failed during flight causing an off airport landing. Investigation revealed the aircraft was using automotive fuel under a supplemental type certificate. Further investigation disclosed the molded cellular carburetor float was extremely heavy from absorbing the fuel. The submitter recommended an Airworthiness Directive requiring use of metal floats in all aircraft using automotive fuel. Facet Aerospace Service Bulletin No. A1-84A applies to all Marvel Schebler aircraft carburetors.

SLICK

Slick **Magnetos**

The Slick Electro, Inc., 4200 and 6200 series magnetos, have been alerted by the Service Difficulty Program automatic alerting function. As a result, this study was conducted to analyze the Slick Magneto data contained in the applicable Aviation Safety Data Banks.

Due to the number of reports, this report is restricted to those failures occurring in the first 500 hours of service during a 2-year period from October 1, 1983, through October 1, 1985. The 500-hour restriction was chosen because of the tear-down inspection at 500 hours time-in-service recommended by Slick Service Bulletin (SB) 2-80. In concurrence with these restrictions, the Service Difficulty Data Bank contains 268 reports on 40 different components in Slick Magnetos. This report will address only those components with 10 or more recurring reports. Therefore, the effort of this report is directed toward five components that account for 44 percent of these 268 reports.

The distributor gear, P/N M-3056, was listed as the part causing trouble in 11 reports. This gear is a component of the distributor block and gear assembly, P/N M-3122, used in the 6200 series magnetos. The major problem reported with this part is a loose center electrode or finger. This metal finger is embedded in the plastic body of the distributor gear. The finger is reported to loosen in the plastic housing and move from its proper place in relation to the gear. This can result in detonation or misfiring of a cylinder. Certain serial numbers of 6220 and 6224 magnetos are referenced in Slick SB 1-84. This service bulletin calls for replacement of the distributor block assembly, P/N M-3122, with an improved version. However, a review of the service difficulty reports reveals this corrective action would apply to only 2 of the 11 reported failures contained in the data bank.

The magneto end frame, P/N M-3095, installed on the 4200 series Slick Magnetos encountered 70 failures. This single item accounted for over 26 percent of the service difficulty reports. There were two cracked mounting flanges reported while the other 68 reports concerned rotation of the end bearing, P/N M-3006, in the bearing bore of the end frame. There were only 19 reports of this problem on factory original Model 4251 Magnetos compared to 48 reports on factory remanufactured Model 4251R Slick Magnetos in the same time period. This problem was previously addressed in Trend Analysis Report No. 84-09-01, Slick Magneto Model 4251R Frame Bearing. Slick SB 7-83, Magneto Bearing Inspection, applies to the end frame bearing, P/N M-3006. The SB pertained to lack of lubrication or contamination of the bearing which can cause seizure and magneto malfunction.

The coil, P/N M-3114, used in Slick 4200 series magnetos was listed as the part causing trouble on 12 reports. The part condition was listed as cracked, burned, open, or shorted on those reports. This coil is the subject of both Airworthiness Directive (AD) 81-16-05 and Slick SB 1-81. None of the coils reported were covered by these inspections because of magneto serial numbers.

The distributor gear and block assembly, P/N M-3121, used in 4200 Series Slick Magnetos, were reported as having a loose electrode, broken brush, worn, burned, or shorted in 13 reports. There were no AD's, Slick SB's, or other publications found that offered an answer to this problem.

The last part identified in this study as a problem area was the impulse coupling, P/N M-3163, used on Slick 4200 series magnetos. AD 74-18-05, AD 80-06-05, and Slick SB 1-80, concern impulse couplings on various Slick Magnetos, but none of the 13 reports received during this period were applicable by serial number. The problems reported were loose rivets or worn or broken pawls.

Will Rogers said...."This thing of talking about 'somebody's life being too valuable to risk in an airplane' is not only the bunk, but it's an insult to the men we ask to do our flying. Where does anybody's life come in to be as more valuable than anybody else's? Ain't life just as precious to one as to another? We have heard that 'can't spare you' attitude till we got a lot of men in this country believing it now. Say, get over that old ego. This country will replace you before your folks get home from the funeral."

February 28, 1929

INSTRUMENTS

SIGMATEK

Sigmatek (Edo-Aire)-Leaking Gyros

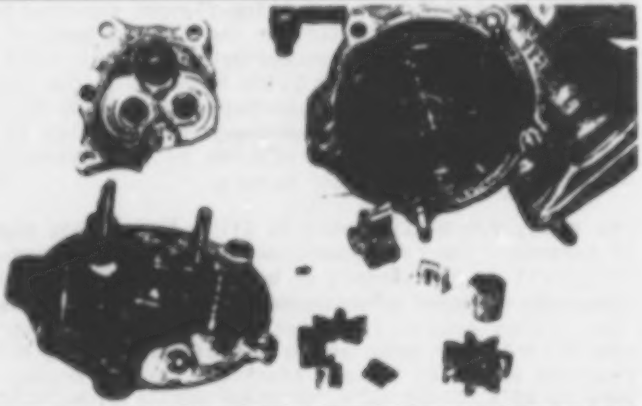
A repair station advised of problems with attitude gyros consisting of air leakage on vacuum operated units. They are developing air leaks in the sealant which is used to fasten the face glass into the bezel. On some units, these leaks will stay small, which is annoying, and on others, it will rapidly increase until the glass comes loose letting air into the gyro to the point that vacuum is lost. This causes failure of the directional gyro as well as the attitude gyro. The submitter also stated that the factory has changed to a new silicon sealant material to eliminate the problem. The material is manufactured by General Electric and is called RTV128. Due to numerous failures, the reporting repair station feels that every Edo attitude gyro which comes into a shop for service should have the bezel removed and it should be checked for any evidence of glue separation. They also feel that all aircraft equipped with Edo attitude gyros should be checked by listening at the glass for any sign of a hissing or whistling sound when the vacuum pump is operating. If there is audible noise, the bezel should be removed and reset with RTV128.

ENGINES

CONTINENTAL

Continental	Oil Scavenge Pump
Model TSIO-520-NB	Gear P/N 640808

The pilot of a Cessna 414A observed oil coming out of the cowling on the right engine soon after takeoff. The engine was shut down and a landing accomplished with no problems. Investigation revealed the scavenge oil pump housing was broken and the drive gear was in pieces. The submitter reported the drive gear had an old crack in it for some time before breaking apart. He suggests all similar gears be inspected.



LYCOMING

Lycoming	Exhaust Push Rod
Model O-235-L2C	P/N 73806-85

During a routine valve clearance adjustment, the number three cylinder exhaust push rod ball end was found loose in the push rod tube. After removal of the push rod, the ball end was easily removed from the tube by hand. Investigation revealed a 5/16-inch lengthwise crack and a 3/16-inch crack around the tube. Airworthiness Directive 80-25-02 R2 does not apply to the push rod by part number, but the problem is identical to the problem covered by the AD.

AUTOMOTIVE GASOLINE

The FAA neither regulates the distribution systems for either aviation gasoline or automotive gasoline nor does it regulate the specifications for either fuel. It does, however, approve the use of fuel to a given specification in an aircraft engine. The distribution, control, and quality of these fuels are maintained and self-policed by industry. Traditionally, industry has claimed to maintain strict control over the distribution for aviation gasoline and has established checks at specific points in the system to ensure product quality. This type of control is not applied to all automotive gasolines.

When automotive gasoline was approved for use in certain aircraft piston engines, the FAA specified only the use of certain gasolines that meet American Society for Testing Materials (ASTM) Specification No. D-439. However, it should be noted that not all automotive gasolines being marketed meet specification D-439 requirements. In addition, there are composition differences between aviation and automotive gasolines which should be recognized when using automotive gasolines in those aircraft engines and aircraft for which STC's have been obtained. Therefore, the following observations are offered:

a. Automotive gasoline for aviation use should be purchased from fuel vendors who are known for their integrity in offering quality products. It is generally preferable to obtain this fuel from airport operators or airport vendors that offer this product because such sources are likely to obtain it from reliable fuel distributors and to maintain typical aviation fuel cleanliness. Appropriate fuel filtering should be done prior to or during refueling whenever fuel cleanliness may be suspect for any reason. The users should familiarize themselves with local ordinances or policy regarding individuals bringing or storing their own fuel on any particular airport.

b. Long-term fuel storage of automotive gasoline in aircraft fuel tanks should be avoided. Although automotive gasolines have lower maximum existent gum specification requirements than aviation gasoline, either fuel can form undesirable gum deposits over long-term storage under particularly severe conditions, such as in barrels and at high temperature. Gum deposits thus formed could result in engine malfunctions.

c. FAA Technical Center testing indicates that carburetor icing will occur in less time and at higher ambient temperatures with automotive gasoline than with aviation gasoline. Therefore, pilots using automotive gasoline should be familiar with the induction system icing prevention procedures of the FAA Advisory Circular AC 20-113 and be prepared to use these procedures at higher ambient temperatures and lower humidities than when using aviation gasolines.

d. After any prolonged period of heat-soak; e.g., aircraft sitting in sun or hot day ground idling, it is recommended that the availability of full power be established before commencing a takeoff.

e. FAA approvals for use of automotive gasoline have not included any gasoline which is blended with alcohol. Gasohol, regardless of whether it meets ASTM D-439, is not considered automotive gasoline for purposes of FAA approvals.

NOTE: Article excerpted from American Bonanza Society Newsletter dated December 1985.

The venerable DC-3, a.k.a. the C-47, the "Gooney Bird," the Dakota (in its British incarnation), and the R4D (as the Navy tagged it), celebrated its 50th anniversary in December 1985. The plane that launched the airline industry as we know it today took its first flight on December 17, 1935. Over 18,000 civilian and military DC-3s were built.

SOMETHING TO THINK ABOUT

NATURE VERSUS AIRCRAFT

With warm weather here, it pays to remember that bird, bee, and mouse nests in aircraft are both hazardous and costly. The size and weight of the materials in such nests is completely out of proportion to the size of the problem they are capable of creating. Their presence in aircraft have been known to cause just about everything from fires in the air to complete engine failures and forced landings. They have been the cause for structural failures that developed because of acidic corrosion from waste matter.

To know that birds, insects, and rodents like to build their nests in aircraft is one thing, and to respect their determination and perseverance is another. In no way should the removal of an existing nest be considered as a victory that assured the displaced tenant would leave the premises permanently. Nor would this action ensure against another unwanted guest not beginning construction shortly thereafter. In warm weather, it should never be taken for granted that a nest or the materials for a nest will not be unexpectedly loaded aboard an aircraft in a very short period of time. Further, it seems that any opening in an aircraft or its systems is an invitation and/or welcome sign to a bird, insect, or rodent. With this thought in mind, it is possible to then look for other evidence of construction materials peculiar to their natural environment. Some typical examples of this are as follows:

Mud smears or droplets at pitot/static masts, fuel tank vents, crankcase breathers, stall warning vanes, external venturi, and cabin air vents are indications of mud dauber activities.

Straw, string, or blades of grass extending from cowling openings, carburetor air intakes, blast tubes, and exhaust stacks are signs of birds at work.

Cotton batting, and shreds of fabric or paper at wheel wells and empennage openings are frequently indicators that rodents (mice) have been around and possibly moved aboard. Incidentally, they will gnaw on any material and specialize in digesting wood spars and waxed rib stitching cord.

Each year there are reports of incident/accidents related to bird, rodent, and insect nests in aircraft. The nests are more difficult to find in some aircraft than in others. The Gulfstream American Model AA-5B is one aircraft susceptible to hidden nests as the article below, which was published in Alerts No. 26, September 1980, indicates:

"While waiting for takeoff clearance, the pilot noticed sparks and smoke coming from the engine compartment. An inspection revealed a bird's nest on the front side of the exhaust muffler. The cowling, alternator, and starter wires were damaged. The nest could not be seen on preflight inspection."

NOTE: The following article in reference to the same problem was published in Alerts No. 13, dated August 1979 and republished in Alerts No. 47 dated June 1982.

"Bird's nests have been found between the nose cowl and the engine cowl inside the heater duct. The birds apparently enter the area through the propeller opening and go down between the cowling to build their nests. The heater duct is inaccessible to visual inspection without pulling the nose cowl. This problem could apply to other similar Gulfstream American aircraft. The submitter recommends an inspection plate be designed and installed on the front cowl so the area can be inspected. It is also recommended the openings be plugged if the aircraft is inactive, even for a short period of time, during the nesting season."

It is recommended that precautions be taken to prevent nest building, but then to also be alert to the possibility of nests and plugged vents during the preflight inspection.

"Tell me, I'll forget. Show me, I may remember.
But involve me, and I'll understand."
...Chinese proverb.

WING ATTACHMENT MAINTENANCE

The wing attachment system and the basic wing structure are worthy of maintenance and attentior now and then on any airplane, and yes, even on the Bonanzas. Of primary concern here is the corrosion that has occurred on the fittings and associated hardware due to fluids that can accumulate in the "bathtub" fittings if the drains are clogged.

The upper fittings (4) have drain holes to drain water or any other fluids that may accumulate from the fitting bolt access area. These drains must be kept open so they can do their intended function. "Drano" is not recommended for these drains. Mild soap, detergent and water, or Varsol, with a soft probe or pipe cleaner would do fine. A little regular attention here is a lot less expensive than replacing the corroded fitting.

Wing bolt and fitting inspections should also be accomplished in accordance with a maintenance manual revision issued by Beech in 1984. A chart in the Wing chapter sets out the recommended frequency for those inspections. While the bolts and fittings are usually found in good condition, it's a lot like going to the doctor to learn you are still a healthy specimen. In other words, it sure feels good to know your wing attachment system is in good condition.

Proper wing bolt torque is an important element of this maintenance. Don't rely on memory of "what the torque is" as there has been a change of torque due to corrosion-proofing coating that Beech recommends to assist in protecting the bolts. This is a film of specified compound of a light lubricant consistency applied to the bolts and fittings. This change requires a "wet torque" value which is different than the "dry torque" which has been in use since inception of the Bonanza. Some bolts and fittings have been damaged because a mechanic put the "remembered" torque on a bolt instead of consulting the manual. The "wet" or coated bolts are supposed to be placarded near the bolt.

Also, different bolt size and location requires different torques. Proper torque application can't be overemphasized as overtorque can damage the bolt and/or fitting, while too little torque can allow the bolt to see fatigue cycles.

All wing bolts on the Baron and Bonanza series are tightened with a torque indicating wrench, while the lower forward bolt on the Duke has a preload indicating washer. This bolt is not tightened to a torque value on a wrench. The other three on each Duke wing use a torque wrench in the same manner as the Baron and Bonanza bolts. The preload indicating washer requires a new assembly any time this bolt is removed and reinstalled.

Beech Aircraft issued Maintenance Manual revisions during 1984 which contain a chart that recommends time intervals to inspect, and time intervals to replace the bolts. Also in the revision is information about the corrosion protecting coating procedure, and inspection of the bolts and fittings. As an interested party in the condition of your flying machine, you should assure this information is being applied to your Bonanza, Baron, or Duke.

In summary, it just makes sense that "the main muckett" of any machine should be maintained in good condition. The new information in the manual is intended to obtain the ultimate toward that end. While the history of the bolts and fittings has been good, it sure doesn't hurt to go for better. After all, some of these joints may not have been inspected for a lot of years.

Whether you do it yourself, or have it done in a Beech shop, assure it gets done according to the new information.

NOTE: Excerpted from American Bonanza Society Newsletter dated December 1985.

SAFETY IS NEVER SIGNING OFF ANYTHING YOU HAVEN'T REALLY
LOOKED AT - AND WOULDN'T FLY IN YOURSELF

☆ U.S. Government Printing Office: 1986—491-810/20714

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JUNE 1986**

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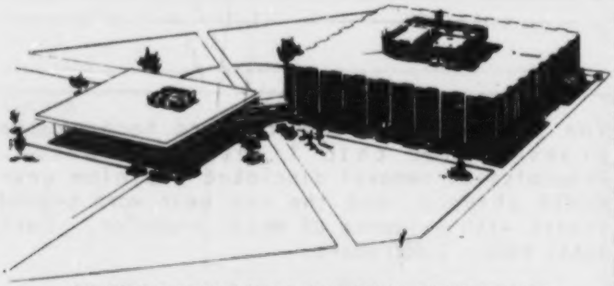
WASHINGTON, D.C. 20590

GENERAL AVIATION AIRWORTHINESS ALERTS

JUNE 1986



AVIATION STANDARDS NATIONAL FIELD OFFICE
MIKE MONRONEY AERONAUTICAL CENTER

The General Aviation Airworthiness Alerts provide a common communication channel through which the aviation community can economically interchange service experience and thereby cooperate in the improvement of aeronautical product durability, reliability, and safety. This publication is prepared from information submitted by those of you who operate and maintain civil aeronautical products. The contents include items that have been reported to be significant, but which have not been evaluated fully by the time the material went to press. As additional facts such as cause and corrective action are identified, the data will be published in subsequent issues of the Alerts. This procedure gives Alerts readers prompt notice of conditions reported via Malfunction or Defect Reports. Your comments and suggestions for improvement are always welcome. Send to: Aviation Standards National Field Office, Attn: AVN-110, P.O. Box 26460, Oklahoma City, Oklahoma 73125.

AIRCRAFT

AEROSPATIALE

Aerospatiale Model AS-350D	Engine Fuel Drain Hose	The engine combustor housing fuel drain hose became plugged. This rubber hose runs through the rear baggage compartment. The hose crumbled into pieces when handled during replacement. The submitter suggests the drain hose be made of a fuel proof material to prevent fuel leaks into the baggage compartment.

ARCTIC AIRCRAFT

Arctic Aircraft Model S-1B2	Flap Control Bellcrank	The flap control bellcrank is located on the upper left longeron aft of the left wing rear spar attach fitting. The clevis pins were found rubbing hard on the longeron. There was also interference between the turnbuckle barrel and the right flap cable. The submitter advised this same condition was found on one other low-time aircraft.

BEECH

Beech Model B36TC	Fuel Return Line Chafing	Reports received indicate a possibility of chafing between the engine fuel return line and the wastegate seal drain line. This condition is believed to be due to engine torque while running under load. The area located approximately 6 inches from the firewall bulkhead fitting of the fuel return line should be carefully checked at each inspection. Aircraft Affected: S/N's EA-1 through EA-439.

BELL

Bell Model 206B-3	Input Pinion Gear P/N 206-040-020-009	The transmission was removed because the transmission chip light illuminated. Transmission removal disclosed a pinion gear tooth chipped, and the sun gear worn beyond limits with evidence of metal transfer. Part total time - 1,950 hours.

CESSNA

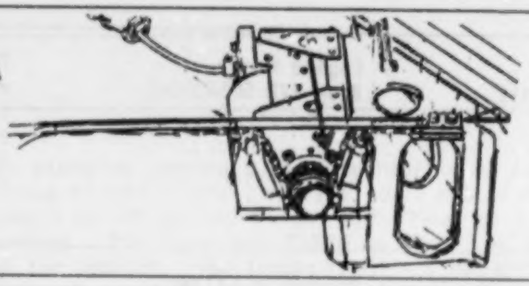
Cessna Model 150 Series	Vertical Fin Attach Bracket P/Ns 0432004-1 and -9	The nutplates were found in good condition when complying with Airworthiness Directive 80-11-04, but the attach bracket was so severely corroded the bracket required replacement. This condition was found on other Cessna 150 airplanes inspected at the same airport. This problem may exist on all Cessna 150 series aircraft and could exist on other Cessna aircraft when a steel bracket of similar design is used without protective coating. The submitter recommends bracket removal for inspection, cleaning, and application of a protective coating. Cessna Service Information Letter SE79-49R1 pertains to the area.
Cessna Model 206, 207, and 210 Series	Elevators and Elevator Trim Tabs	

Corrosion in the trailing edges of the elevators and trim tabs is still being reported. The submitter of a recent report stated that trailing edge delamination was caused by water retention in the foam stiffening material. Internal corrosion was present at all delaminated areas. It is recommended the area be checked carefully at scheduled inspections.

Cessna
Model 208

Chain Chafing
Actuator Mounting
Screw

Inspection revealed the servo actuator sprocket chain hitting an actuator mounting screw. The screw and chain showed indications of the chafing.



Cessna
Model 208

Fuel Tank Substance

A jelly-like substance was found inside the fuel tank during modification of the fuel tank. The substance was believed to be primer paint. This condition was found on two separate aircraft.

Cessna
Model 210

Leaking Brake
Line

The pilot reported the right brake was spongy. Inspection of the right brake system revealed pin size holes in the brake line just before the line entered the gear leg. The submitter had found this problem on another Cessna single engine retractable gear aircraft. He recommends inspection of the entire brake system during every maintenance check and during preflight inspections. Aircraft time - 812 hours.

Cessna
Model T303

Chafed Strobe
Light Wire

The right wing strobe light became inoperative. While checking to determine if the strobe power pack was getting power, the power wire was found chafed through at an angle and was grounded out. The wire is routed by the fuel tank. A new connector was installed on the wire, and a chafe strip installed on the angle. Aircraft time - 88 hours.

Cessna
Model 402A

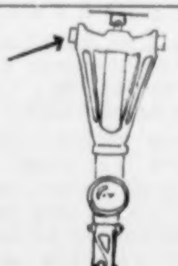
Nose Baggage
Door

Immediately after takeoff rotation, the left nose baggage door departed the aircraft. Inspection revealed both hinges were broken, and the forward latch was worn. The door was reinstalled with new hinge arms, and the forward latch was replaced. Inspection of higher time aircraft for worn hinges and latch conditions was recommended. Aircraft time - 10,900 hours.

Cessna
Model 404

Nosegear Trunnion
P/N 5042001-6

The nosegear upper right bearing support broke during landing roll. Aircraft time was not given. There was a similar report on a Cessna 421C published in Alerts No. 76 dated November 1984. The submitter of that report recommended trunnion removal for inspection each 1,000 hours.



Cessna Model 411	Engine Mount Beam P/N 5054010-1	The left engine outboard engine mount beam cap was found worn 75 percent through by the exhaust system slip joint shield. The shield was attached properly, but had been bent down against the engine mount beam. Engine vibration caused the shield edge to wear into the mount beam cap.
Cessna Model 425	Hydraulic Filter Leakage	There was leakage from a hydraulic filter during flight. The submitter states that Maintenance Manual procedures are inadequate for leak checking the filters on the ground. The published procedures do not load the hydraulic system with enough pressure to adequately test for leaks. The submitter suggests the inadequate procedure could apply to other Cessna aircraft such as 402C, 414A, and 421C.

CHAMPION

Champion Bellanca Model 8KCAB	Chafed Oil Line	During windshield replacement, the aluminum line from the firewall to the oil pressure gauge was found nearly chafed through. The line had been chafing against the manifold pressure line. Aircraft time - 322 hours.

EMBRAER

Embraer Model EMB-110	Maingear Strut Assembly	During taxi for departure, the left maingear broke at the axle. The axle, brake, and wheel assembly separated from the gear strut assembly. Inspection of the broken area revealed a previous 1 1/4-inch crack which contained rust and corrosion. Part total time was 5,714 cycles. There was a similar report of the left maingear axle breaking at the strut attach point during taxi for departure. Total cycles on this part was 11,831.

FAIRCHILD INDUSTRIES

Fairchild Model FH-227E	Brake Rotating Disc P/N 9543193	The rotating disc broke into pieces causing the brake to lock. Inspection of the other brakes revealed three cracked discs. The return spring clearance was found improper on two brake assemblies. The submitter recommends inspecting all P/N 9550336 brake assemblies for proper return spring clearance, and if the assembly is installed on the aircraft, inspect for cracked rotating discs.

GATES LEARJET

Gates Learjet Model 25	Servo Frozen	The elevator controls were reported to be jammed during flight. The controls could not be moved forward or aft during flight but freed up after landing. Moisture was found between the servo and the capstan. The trapped moisture apparently froze at altitude then melted after landing. No other discrepancies were found in the elevator control system.
Gates Learjet Model 55	Flap Sector Bracket P/N 2322516-176	Inspection to determine the cause for a difference in flap selection and indication disclosed the right flap sector bracket was cracked in several places. The brackets were replaced with P/N 2322516-214 brackets. The submitter advised they plan to replace all the upper brackets in the aircraft fleet with steel brackets. Aircraft time - 1,204 hours.

GULFSTREAM AEROSPACE

Gulfstream Model AA-5A and -5B	Seat Support	The bolts and rivnuts loosen and come out of the spar. This could allow the seat to fall off the spar and create some anxious moments should it happen during rotation or climb. The submitter advises he finds loose seat support bolts and rivnuts on most of the aircraft he inspects. He suggests mandatory inspection of this area each 100 hours and possibly a better design from the aircraft manufacturer.
Gulfstream Model 112TC	Spar Cap Cracks	Cracks were found in the right wing top spar cap during compliance with Gulfstream Service Bulletin No. 112-71. Inspection of three aircraft disclosed spar cap cracks in five wings. The submitter recommends making the SB into a mandatory airworthiness directive.
Gulfstream Model 114	Spar Cracks	Cracks were found in the top spar cap on both wings while complying with Gulfstream Service Bulletin No. 114-22. Cracks were also found radiating from the holes in the forward spar where the main landing gear fitting attaches to the spar. These spar cracks were not covered in the SB. Some cracks were not visible until the spar cap was cut away. The submitter suggests revising the SB to include inspection of the forward spar and make the SB into a mandatory airworthiness directive.

MITSUBISHI

Mitsubishi
Model MU-2B-60

Starter/Generator
End Support
P/N 23046-1470

The end support had a continual history of cracking. The repair station reported replacing nine end supports in the past year. The submitter advised that end support P/N 23046-1630 is interchangeable and does not have the same cracking problem.

MOONEY

Mooney
Model M20K

Fuel Tank

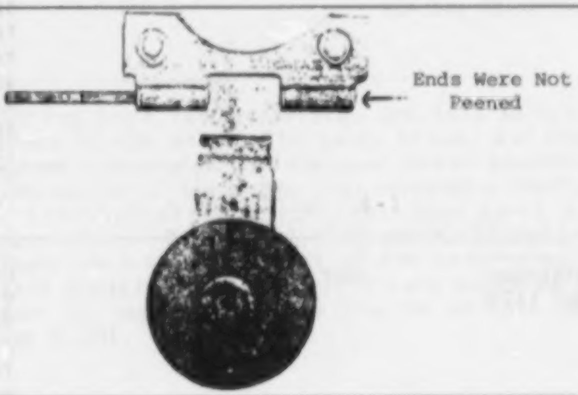
While complying with Airworthiness Directive 85-24-03 using instructions called out in Service Bulletin M20-230, approximately three cups of fuel and water were found trapped in the wing due to plugged drain holes. In the service bulletin, there were no instructions to remove the most inboard fuel tank access cover. There were about two cups of fuel and water found due to plugged drain holes in the rear stringer between W.S. 24.50 and W.S. 43.50.

The submitter suggests a review of M20-230 to determine whether the instructions are adequate.

Mooney
Model M20K

Missing Valve

The moveable portion of the forward antislosh valve in the left wing was found missing during an inspection in accordance with Mooney Service Bulletin M20-230. The pivot shaft had backed out of the hinge and allowed the flapper to fall. There was no peening to prevent the shaft from moving. Aircraft time - 1,101 hours.



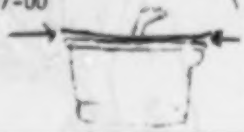
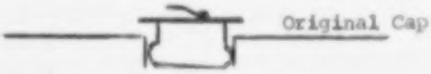
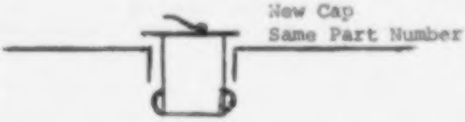
PILATUS BRITTEN-NORMAN

Pilatus
Britten-Norman
Model BN-2 Series

Flight Manual

Some of the BN-2 series flight manuals do not include preflight procedures to check for fuel contamination. Until revised copies of these manuals are received, pilots should check for fuel contamination by draining the fuel tank sumps before each flight. Pilots are also cautioned to be alert for possible contamination when refueling.

PIPER

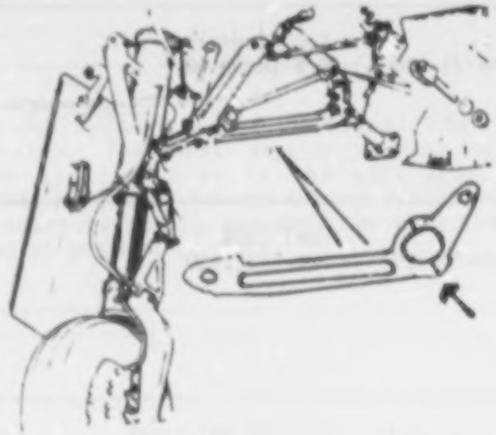
Piper Model PA-23-250	Cap Assembly P/N 16097-00 	New fuel cell caps from vendors are not sealing correctly. The upper plate is bent up and this results in fuel leakage due to siphon effect of the airflow over the wing. The submitter advised that the top plate was bent up on new caps in stock.
Piper Model PA-24-250	Fuel Caps P/N 27221-00	Two weeks after installing the new thermos type fuel caps, the aircraft owner advised the caps were too tight. Visual inspection and adjustment of the caps revealed the rubber portion had swollen making removal and installation very difficult. The aircraft uses 100LL fuel.
Piper Model PA-28-140	Aileron Bellcrank Support Bracket	The left and right support brackets were found cracked at the forward end during an annual inspection. The submitter advised this was the fifth PA-28 series aircraft he had encountered with cracked brackets. He recommends a thorough inspection of the aileron bellcrank support brackets during each inspection.
Piper Model PA-28-161	Wing Bolt Cover P/N 63942-00	Upon removing the inspection covers for the wing attach bolts of the front spar, flakes of rust were found piled in the cover and the nuts for the wing bolts were found severely rusted and corroded. This condition is believed to be caused by the lack of a drain hole in these particular covers. Water was able to collect in the covers resulting in deterioration. The submitter advised the origin of these covers are suspect. An inspection for the existence of drain holes, which are normally found in these covers, was suggested.
Piper Model PA-28RT-201T	Nosegear Actuator Hose	The nosegear extended during cruise flight. The gear did not lock in the down position when first extended, but the pilot was able to get the gear to lock down by kicking the rudder and slipping the aircraft. Investigation disclosed the actuator hose was leaking at the end fitting allowing depletion of all hydraulic fluid. An airworthiness directive pertains to Detusch hose assemblies of the same part number manufactured during 4Q77 and 1Q78. This failed hose assembly was manufactured during 3Q78. Aircraft time - 860 hours.
Piper Model PA-30 The submitter advised of receiving new fuel cell caps that are much deeper than the original caps. The new cap has a tendency to expand below the tank filler walls and allows water to enter the fuel tanks.	Cap Assembly P/N 27221-00	 

Piper
Model PA-31

Link Assembly
P/N 40279-00

The left gear retraction link broke when the gear was selected up. The gear remained in the down and locked position, and the aircraft landed without further incident. The submitter advised of other failures of this part and high operating hours may be contributing to the failures. Aircraft time - 7,609 hours.

NOTE: The above article was published in Alerts No. 74 dated September 1984. There was a recent report of the right link assembly breaking on a PA-31T preventing gear retraction. Corrosion in the failed link revealed a crack had existed for a period of time. Inspection of the left link disclosed it was cracked. Aircraft time - 4,094 hours.



Piper
Model PA-32R-300

Engine Mount
Cracked

While making a lower cowling repair, the mechanic noted a crack in the engine mount at the lower rear inboard right side weld cluster. The crack extended approximately 270 degrees around the rear support tube. The crack was in a location as described in Piper Service Letter No. 799. The mount was replaced with a unit containing the reinforcement gussets. The submitter recommends continual 100-hour inspections of the area and installation of mounts with reinforcement gussets as soon as pracical or at engine overhaul on affected aircraft.

Piper
Model PA-38-112

Carburetor Heat
Valve Screws

During a 100-hour inspection, the carburetor heat valve attachment screws were found partially backed out, and the screw heads were nearly sheared. Prior to this, there was normal r.p.m. drop indicated with carburetor heat. The submitter advised the inspection must be done while carburetor heat is operated and the air filter removed; otherwise, it could be missed.

Piper
Model PA-44-180

Deteriorated Fuel
Vent Hoses

All vent hoses from the fuel tanks were found split or broken during an inspection. The submitter advised it appears that the hose is incompatible with the fuel, or the hose is very very old. He suggests inspecting the vent hoses in all aircraft in the serial number range of this aircraft, which is 44-7995030.

Piper
Model PA-46-310

Alternator Bearing

The alternator drive end bearing failed causing damage to the alternator case and components. There were nicks in the engine drive gear which caused metal contamination of the engine oil system. Alternator time - 513 hours.

Piper Model PA-60-600 Series	Rudder Control	Three recently processed Malfunction or Defect Reports cited excessive play in the ventral rudder due to loose rivets and elongated rivet holes. Each of the airplanes involved had been modified by the Piper factory in accordance with Piper Service Bulletin 770 to install a ventral rudder assembly. Piper SB 770 is one of the methods that may be utilized to comply with Airworthiness Directive 83-14-07. The loose rivets were located at the junction where the horn assembly is attached to the torque tubes of both the main and ventral rudders. The average time from Piper SB 770 implementation to the discovery of the excessive rudder play was 128 flight-hours. A review of Piper SB 770 was suggested to determine whether the instructions and materials provided are adequate to ensure the airworthiness of the modification. One submitter recommended the use of close tolerance bolts in place of the rivets as an improvement. NOTE: This article was published in Alerts No. 82 dated May 1985. There was a recent report of finding loose rivets 130 hours after complying with AD 83-14-07 as specified in SB 770.
Piper Model PA-60-600A	Induction Hose	The left engine was surging slightly just after takeoff and continued to surge with loss of power during climb. The engine was secured, propeller feathered, and an emergency landing completed. During ground run, low power operation was normal, but the engine began to lug down at 2,000 r.p.m.; and at full throttle, the r.p.m. dropped rapidly. Investigation disclosed the flexible induction air hose between the air box and the fuel servo collapsed during high-power settings.
Piper Model PA-60-601P	Broken Bolt P/N 402 878	The steering arm bolt broke where the rod end attached to the collar. The bolt had other cracks adjacent to the break. The submitter recommends replacing the bolt each 1,000 hours. Aircraft time - 1,292 hours.

SIKORSKY

Sikorsky Model S-76	Bolt Installation	During cruise flight, the pilot experienced a grinding sensation in the cyclic, collective, and directional controls. Investigation disclosed the lateral bellcrank bolt was chafing the hydraulic manifold. Further investigation revealed the bolt had been installed 180 degrees from the position shown in the Illustrated Parts Catalog. The submitter recommends the maintenance manual include instructions regarding the proper installation of this bolt.

ACCESSORIES

BENDIX

Bendix Magneto Model S4LN-1209	Distributor Gear	The right magneto on a PA-28 failed during climb after takeoff. There was no indication of a problem prior to takeoff. Removal and disassembly of the magneto revealed the distributor gear was broken into several pieces. Magneto time since overhaul - 136 hours.
Bendix Magneto Model D6LN-2230	Distributor Gear	During an annual inspection, the contact finger was found loose on one distributor gear. Bronze bearing dust had permeated the block, and the block was cracked at the rotor bearing.
Bendix Magneto Model D6LN-3200	Distributor Block Bearing	The pilot reported the magneto was inoperative. Opening the magneto revealed excessive gear and bearing play. The distributor gear bearing was loose in the distributor block. The submitter advised the block was the new brown type. Part total time - 245 hours.

CHAMPION

Champion Oil Filter Model CH-48111	Oil Filter Leak	During leak check run of the engine after a routine inspection and oil change, a leak was found in the area of the oil filter. Closer inspection revealed that the oil filter itself was leaking in the area of the beaded end. This was the second such occurrence on the CH48111 filter in the past month.

SLICK

Slick Magneto Model 4250R	Leaking Seal	The magneto was inoperative during engine check. Investigation revealed the magneto was full of oil. Magneto time since new - 72 hours.
Slick Magneto Model 4251	Spun Bearing	Both upper and lower bearings spun within the bearing bore of the frame. Slick Bearing Conversion Kit M-3318-4, as per Service Bulletin 7-83, had been installed 397 hours previously.
Slick Magneto Model 6210	Distributor Gear P/N M3056	Brass dust was found in the left magneto on a Cessna 182 during a 100-hour inspection. Removal of the magneto revealed the distributor gear electrode was loose and hitting the ignition lead contacts. Part time - 552 hours.

INSTRUMENTS

United Instruments, Inc. Altimeters P/N 5934 Series	Altimeter Set Knob	In adjusting the barometric pressure window setting, using the altimeter set knob, the operator can inadvertently disengage the barometric scale. This will reset the altimeter to an erroneous setting. The altimeter calibration accomplished in the instrument shop is no longer accurate. The altimeter could be off several hundred feet. This condition was found on new instruments in stock as well as those in service. Two repair stations reported this same condition in one day. One repair station estimated 60 percent of their United Instrument altimeters in the 5934 series failed in this manner. Some of the failed altimeters appear to be in the not-all-inclusive serial number range of 9C750 through 30000. Airworthiness Directive 86-05-02 has been issued pertaining to the problem.

MAINTENANCE NOTES

NICKED-KNOCKED PROPS

Ten inches of the propeller tip separated during flight which resulted in a cracked engine mount and other vibration damage to the engine accessories. Probable cause - a previous rock nick in the propeller. This recent incident prompted the article below.

"The metal propeller appears to be one of the most durable parts of the modern light aircraft; and indeed it is, when properly maintained. But as an instrument of thrust, it has more pressure exerted against it than any other part of the aircraft. The blades are designed and constructed in such a manner as to withstand maximum power loading, but when the shape of the blade is marred or disturbed, its inherent strength can be reduced to a point where blade failure in flight is possible. Such failure can take place entirely without warning."

Most pilots find it hard to believe that a small cut or nick in a sturdy metal propeller can lead to a broken prop. To understand how this is possible, it helps to know something about the stress and force to which a propeller in action is subjected.

The most obvious force is centrifugal - the rotating action which exerts an outward pull on the blades. If you imagine an enormous giant trying to draw your arm out of your socket, exerting a force of 7,500 times the weight of your arm, you can appreciate the strain on the blade.

The revolving blade is also subject to a centrifugal twisting force, which may be visualized as the effect of a gigantic hand attempting to flatten the blade, exerting a force as high as 20,000 pounds per square inch. Again, the thrust exerted by the propeller results in a forward pull of the blades. Straining the engine to pull the plane out of a mudhole can result in an out-of-track prop. These two kinds of stress produce lines of force running across the face of the blade.

But the kind of stress which is believed responsible for most blade failures, in conjunction with surface damage in piston-driven aircraft, is the vibratory stress set up by the engine forces conveyed to the propeller by the crankshaft to which it is bolted. This produces oscillating forces within the blade which change patterns as the engine r.p.m. changes. The locations on the surface of the blade where maximum bending occurs are called nodes; at these locations the greatest amount of stress occurs. Even slight damage at these points can seriously weaken the propeller.

Con't on page 12

Any mechanical damage to the prop creates an opportunity for blade failure. Nicks, cuts, or corrosion pits can set up stress points by interrupting lines of force. Certificated mechanics are trained to round out depressions in the blade in such a manner as to minimize the concentration force at a given point.

The ordinary preflight inspection tends to scan the propeller. The pilot may do nothing more than run his eye down the leading edge of the blade and, if nothing catches his attention, move on. What he should do, realizing the consequences of an in-flight propeller failure, is to scrutinize and feel - with clean, dry hands - the entire surface of the blade. Nicks or cuts that escape the eye are often easily perceptible to the fingers. Inspection is easier and more accurate if the blade is kept clean. This is facilitated by occasional waxing with a paste wax, which helps prevent corrosion. Decals on a prop, incidentally, have been known to permit the accumulation of hidden corrosion.

Note that the removal of small nicks or defects is not "preventive maintenance," which may be performed by the pilot or owner, but is defined in FAR Part 43 as "minor repairs," and requires the service of a qualified mechanic."

"One little nick could knock you out of the sky."

NOTE: Above article previously published in Alerts No. 38 dated September 1981. There have been recent reports of separation of portions of the propeller during flight.

THAT TIME AGAIN - BIRD PROBLEMS

A Piper Turbo Arrow had been parked on the tiedown area for a week. The aircraft was moved into the shop for maintenance. The top cowl was removed and a large bird nest containing several eggs was found.

The nest completely filled the oil cooler inlet area which would have caused high oil temperature.

Birds can construct a large nest of straw, string, cloth, and other combustible materials in a short period of time. All concerned should be aware and inspect for these conditions during the nest building season.

NOTE: This article was published in Alerts No. 82 dated May 1985. There was a recent report of a bird nest clogging the air inlet to the air cycle machine in a Mitsubishi MU-2B-25. The air cycle machine overheated causing the bearings to seize. The submitter suggested a screen be designed to prevent birds from entering the air inlet.

SPECIAL NOTICE

FAA Malfunction or Defect Report Form No. 8010-4 dated May 1981 states in the upper right box that "USE EXPIRES 3-31-84." Please ignore this expiration date. The May 1981 edition of FAA Form 8010-4 remains acceptable for reporting malfunction or defect data. Your continuing contributions to this data gathering process are urgently requested to enable our detection of trends and notification to the aviation community.

OF INTEREST

ENTRY FORM

A copy of the entry form for the 1986 General Aviation Maintenance Technician of the Year National Award is published on the following page. This form, or a copy thereof, may be used for your selection of the Maintenance Technician of the Year. This entry form should arrive at your local FAA District Office by June 30, 1986.

ENTRY FORM FOR

1986 GENERAL AVIATION MAINTENANCE TECHNICIAN OF THE YEAR NATIONAL AWARD

INSTRUCTIONS: Use a separate form for each entry. All entries must be either typewritten or neatly hand lettered.

Name:
Address:

FAA Certificate No.:
FCC License No.:
Telephone No.:

Employer:
Employer's Address:

Year first designated a Maintenance Technician:
Years experience:

Entry Details: *Describe in 500 words or less your background (or that of the person you are nominating) as an aviation maintenance* ***technician****, including any safety contributions (procedures, devices, techniques, or inventions) enhancing aviation safety. Include any other* ***information*** *you find pertinent to this award selection. All entries become the property of the National Selection Committee and will not be* ***returned****.*

(if additional space is required, attach additional sheets)

ENTRY SUBMITTED BY: *(if other than entrant)*

Name:

Address:

Employed by: *(name and address)*
Position held:

Date:

Signature of person submitting entry:

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**Federal Aviation
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General Aviation Airworthiness Alerts

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AC No. 43-16

ALERT NO. 96
JULY 1986

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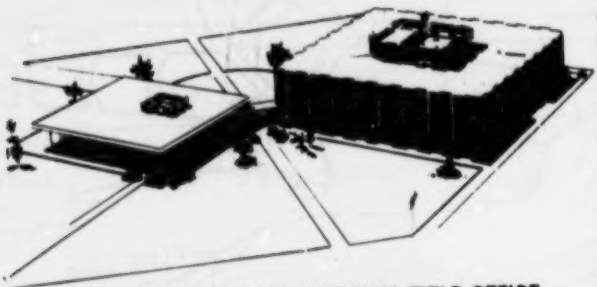
ADVISORY CIRCULAR
AC 43-16

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C. 20590

GENERAL AVIATION AIRWORTHINESS ALERTS

JULY 1986



AVIATION STANDARDS NATIONAL FIELD OFFICE
MIKE MONRONEY AERONAUTICAL CENTER

The General Aviation Airworthiness Alerts provide a common communication channel through which the aviation community can economically interchange service experience and thereby cooperate in the improvement of aeronautical product durability, reliability, and safety. This publication is prepared from information submitted by those of you who operate and maintain civil aeronautical products. The contents include items that have been reported to be significant, but which have not been evaluated fully by the time the material went to press. As additional facts such as cause and corrective action are identified, the data will be published in subsequent issues of the Alerts. This procedure gives Alerts readers prompt notice of conditions reported via Malfunction or Defect Reports. Your comments and suggestions for improvement are always welcome. Send to: Aviation Standards National Field Office, Attn: AVN-110, P.O. Box 26460, Oklahoma City, Oklahoma 73125.

AIRCRAFT

BEECH

Beech Models 19, 23, 24, 76, and 77	Delamination of Foil on Honeycomb Panels	It was recommended that operators of these aircraft inspect the aft fuselage interior for the general condition of the honeycomb panels. Panels should be inspected for deterioration of the honeycomb material, separation of the panel from the aircraft, and delamination of the foil cover sheet from the panel. If the panel is found to be separating, it should be rebonded to the skin. As a good housekeeping practice missing pieces should be located and removed. It is permissible to remove the foil cover sheet from the panel with no adverse effects.

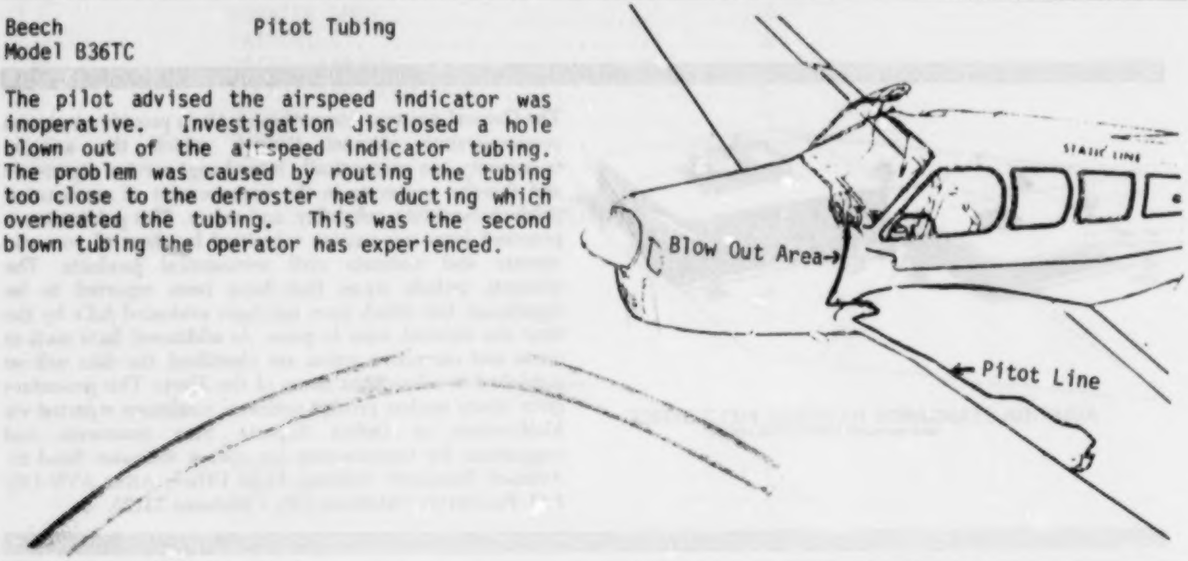
NOTICE TO READERS: The General Aviation Airworthiness Alerts are, for the most part, prepared from information supplied by those who operate and maintain aircraft. The FAA encourages the reporting of all malfunctions or defects that come to the attention of service or operating personnel, even though the problem has been previously reported. FAA Form 8010-4, Malfunction or Defect Report, which supersedes FAA Form 8330-2, Malfunction or Defect Report, is available from the local General Aviation District Office and may be used for reporting purposes.

Beech Models A36 and B36TC	Deicer Boot Leads/ Spinner Screw Interference	The deicer boot electrical retaining leads were found chafed by the spinner retainer screws located at the forward part of the blade opening. This problem may be corrected by installing shorter screws where interference with the boot leads occurs. In the future, the lead strap or replacement boots should be relocated to prevent contact with screws.

Beech
Model B36TC

Pitot Tubing

The pilot advised the airspeed indicator was inoperative. Investigation disclosed a hole blown out of the airspeed indicator tubing. The problem was caused by routing the tubing too close to the defroster heat ducting which overheated the tubing. This was the second blown tubing the operator has experienced.

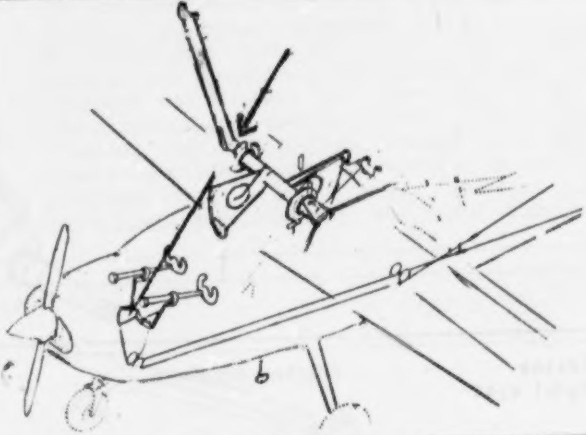


Beech Model C90	Cracked Maingear Wheels	Tubes were found installed in the maingear wheel tubeless tire assemblies. Inspection of the wheel halves revealed the brake halves of both wheel assemblies were cracked. The submitter advised that it appears that tubeless tire leaks are being corrected by installing a tube rather than by inspecting the wheel halves for cracks. This is the second recent incident of cracked wheels containing tubes the submitter has encountered.
Beech Model C90A	Microphone Switch P/N 601-4300	The switch was keyed during approach and stuck in the keyed position until it was unstuck by rapping on the control wheel. The submitter advised this was the fourth switch failure within 500 operating hours in this aircraft.
Beech Model 1900C	Airstair Door Bracket Bolts	During maintenance preflight, three of four door post assembly attach bolts were found sheared. The post assembly, door snubber, and open-close cable pulley attach to this bracket. The sheared bolts were drilled out, threads chased, and new bolts installed. Aircraft time--3,482 hours.

BELLANCA

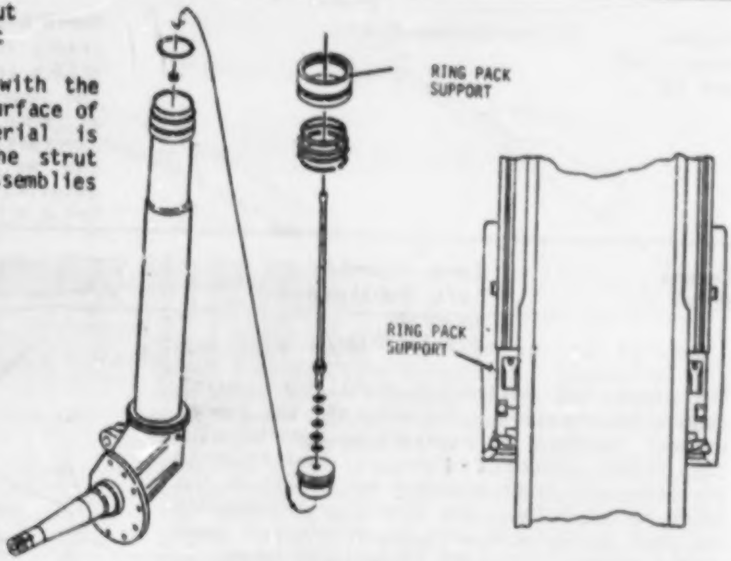
Bellanca Model 8KCAB	Cracked Gussets P/N 1-98771	The gussets above and below the forward spar were found cracked in a number of ribs outboard the area where the lift strut attaches. In two instances, the gusset and P/N 5363 ribs were actually broken through from the radius down through to the fabric. Airworthiness Directive 74-23-04 had been complied with and the ribs had been reinforced per Bellanca Kit No. 243. The submitter recommends inspecting all Bellanca Model 8KCAB aircraft flown for aerobatics.

CESSNA

Cessna Models 150 and 152	Engine Mounts	There have been a number of reports concerning cracks in the weld joint where the lower tubes attach to the nose gear lower mounting collar. The submitter recommended this area be checked at each required inspection on high-time aircraft. If in doubt about the condition of the welds, remove the paint for a more detailed inspection.
Cessna Model 177	Lever Assembly Left Stabilator Quadrant P/N 1767033-7	

The pilot lost horizontal stabilator control soon after rotation. The aircraft was landed without incident by maintaining control with the right control column. Investigation disclosed the lever assembly was broken at the lower attach point. The submitter recommended the part be replaced with new reinforced lower attach points. Aircraft time--1,398 hours.

Cessna Model U206	Champion Oil Filter P/N CH48109	An operator reported the Champion replacement for the Continental P/N 643227 oil filter will only engage 1.5 turns on the adapter stud when installed and torqued. The Continental filter engages three full turns when torqued. The submitter advised the Champion filter has a chamfer at the beginning of the thread in the filter base, otherwise the filters appear nearly identical. This P/N CH48109 filter may be listed as a replacement for other Cessna aircraft utilizing the Continental IO-520 engine.

Cessna Model 208	Low Level Fuel Sensor	The low level fuel sensor was found dangling by the electric wires in the bottom of the tank. The attachment nut had backed off and was still contained by the wires. This condition was found in both the left and right fuel tanks. Aircraft time--471 hours.
Cessna Model T303	Deicer Boot Control Valve	Power was lost to the vacuum instruments during an approach in IFR conditions. The aircraft was landed after some anxious moments. Investigation revealed the left vacuum pump and the right deicer boot pressure control valve had failed. The submitter advised the deicer boots began to cycle on and off without the switch being actuated. It is believed that the pressure control valve was stuck before the vacuum pump failed. The submitter recommended moving the deicer boot pressure control valve behind the engine firewall to reduce contamination.
Cessna Model 402B	Landing Gear Strut Ring Pack Support	An operator has continuing problems with the bearing material glued to the inner surface of the ring pack support. The material is deteriorating and lodging between the strut seals. The operator replaced 12 assemblies within a 12-month period. 
Cessna Model 414A	Cracked Nutplate	While performing Airworthiness Directive (AD) 85-13-03 R2 in accordance with Cessna Multiengine Service Bulletin (SB) ME85-3, a crack was found in an engine mount fitting nutplate. The submitter suggests that the AD or SB be expanded to include checking the nutplate for cracks.
Cessna Model 650	Gear Switch Wire Broken	The right landing gear would not retract after takeoff. Investigation revealed a broken electrical wire at the right main uplock switch. The mechanic advised this was the second identical occurrence. The operator installed a support clamp to prevent wire breakage.

DORNIER GMBH

Dornier Model DO 228 Series 100/101, Series 200/201 Airplanes	Chafing Generator Cable in Right Hand Inner Wing Leading Edge	Dornier issued an all operators telex No. AOT/228/86/011, dated February 1986 to inspect the right-hand generator cable during the next preflight for chafing damage caused by Leading Edge Ribs Nos. 2 and 3 in the right-hand inner wing leading edge. In case damage is found to the generator cable, install edge protection to Leading Edge Ribs Nos. 2 and 3 in the affected area using standard aircraft leather or any available standard aircraft U-shaped rubber. Contact the Dornier U.S. representative to obtain repair instructions.

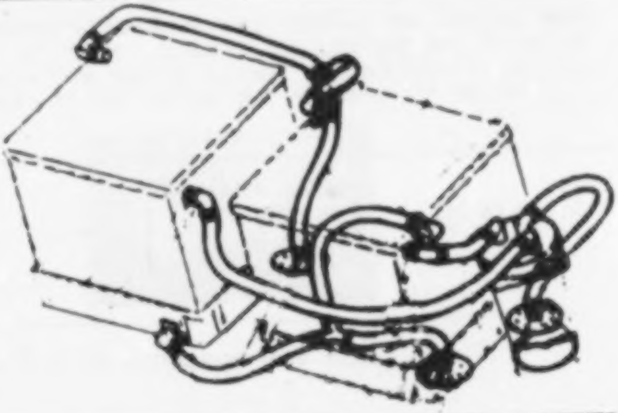
FAIRCHILD

Fairchild Model SA226-TC	Sheared Bolt P/N AN3-31A	The operator found the retaining bolt for the main landing gear trunnion pin sheared. A fleet inspection revealed 11 more retaining bolts sheared. The submitter advised the gear is lubed using air pressure and there is no relief for the grease. This hydraulic force may be causing the bolts to break.
Fairchild Model SA227-AC	Nosegear Uplock	The nosegear would not extend using the normal system. The manual extension system was used to extend and lock the gear. The uplock striker arm assemblies were adjusted, and the nosegear was cleaned and lubricated. Gear operation was normal after adjusting, cleaning, and lubricating. There have been several similar reports of nosegear extension problems being corrected by striker rod adjustment, gear cleaning, and lubrication.

GATES LEARJET

Gates Learjet Model 35	Battery Vent Hose P/N 2588074-27

The batteries were removed for servicing during a phase inspection. Inspection of the batteries after reinstallation revealed the air "inlet" and "exit" hoses were reversed. Both inlets were on one battery, and both exits were on the other battery. The submitter suggests the hoses be clearly marked inlet or exit to help eliminate the possibility of unvented batteries. Airworthiness Directive 86-05-05 pertains to relocating the battery inlet vent on certain Gates Learjet aircraft.



GULFSTREAM AEROSPACE

Gulfstream Model 112TC	Forward Wing Spar	When performing an inspection in accordance with Service Bulletin 112-71, the right wing spar was found cracked.
Gulfstream Model 114	Forward Wing Spar	While performing an inspection in accordance with Service Bulletin 114-22, both wing spars were found cracked.

MOONEY

Mooney Model M20J	Leaking Fuel Hose	The fuel pressure hose, from the fuel injector to the pressure tranducer, was found deteriorated and leaking during pressure check of the boost pump. The hose assembly looked normal until fuel pressure was applied. Mooney Service Instruction M20-69 recommends replacing deteriorated P/N S94890145 hoses with a new P/N 600375-27 fire resistant hose assembly. The SI M20-69 is applicable to Mooney M20 aircraft serial numbers 24-0378 through 24-1377.

PIPER

Piper Model PA-28-151	Muffler Assembly P/N 66894-03	Investigation to determine why the pilot had not responded to tower communication revealed the pilot and passenger were unconscious from carbon monoxide. The aircraft was at the airport pre-takeoff runup area. The pilot and passenger recovered after treatment at a nearby hospital. Inspection revealed a hole in the muffler outer housing which allowed exhaust gasses into the cabin heat system. Piper recommends system inspection each 100 hours and muffler replacement at 1,000 hours. Apparently, compliance with these recommendations had not been accomplished in the 3,400 hours the aircraft had been operated. The submitter recommends an Airworthiness Directive to make the manufacturer's recommended inspection intervals and replacement times mandatory.
Piper Model PA-28-161	Muffler Assembly P/N 66894-03	The muffler shroud was removed during an inspection of the engine exhaust and heater system. Removal of the shroud revealed a bulge and discolored area in the muffler outer housing. Internal inspection disclosed the inner baffle was broken in many places. This operator had not complied with Piper recommendations of inspection every 100 hours and replacement at 1,000 hours total time. Aircraft time--2,750 hours.

Piper
Model PA-28,
PA-32, and PA-34
Certain Serial
Numbers

Ammeter Problems

While complying with Piper Service Bulletin No. 811, the drawing No. 88046 supplied with kit No. 765 186V was found inaccurate. Paragraph 2.6 advises to connect the light gage shunt wire that is terminated at wire P3A to the left hand ammeter stud as viewed from the rear of the ammeter. Figure 3 shows the light gage shunt wire that is terminated at wire P3B attached to the left hand ammeter stud as viewed from the rear. Piper Service Bulletin No. 811 dated January 8, 1986, supersedes and voids Service Bulletin No. 698A dated August 17, 1982.

Piper
Model PA-31-350

Gear Selector Solenoid

The Service Difficulty Program data bank contains 16 reports of Piper Model PA-31-350 landing gear selector safety solenoid failures. These reports were processed during a 64-month period, from March 23, 1979, through July 16, 1984. An upward trend began in 1984 as one report was processed in May and five in July of 1984.

Failure of the landing gear selector safety solenoid, Part No. 487155, to engage the landing gear control lever could enable landing gear retraction while the aircraft is on the ground. Bent or misaligned solenoid plungers accounted for 9 of the 16 reports. Two reports listed the solenoid plunger return springs as broken and missing. The remaining five reports listed the solenoid as failed, stuck, corroded, and worn, and one had a broken wire.

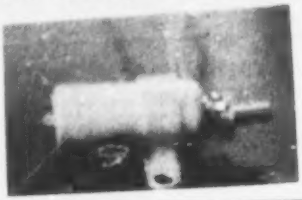
The submitters of two reports of bent solenoid plungers state they have found five additional Piper PA-31-350 airplanes with the same condition. However, the five failures mentioned apparently were not submitted for data entry as our research did not reveal these reports.

While checking operation of the hydraulic pumps, the pilot's operating handbook directs the operator to place the landing gear handle in the down position at engine start and shutdown. Reports have been received of some operators performing this check while taxiing instead of at engine start and shutdown. During this operational check, the landing gear handle is returned to the neutral position as the result of hydraulic pressure and a mechanical linkage. Should the safety solenoid plunger fail to engage the gear handle at the neutral position, it would be possible for the gear handle to pass through neutral to the gear up position. In addition, failure of this safety feature would allow the gear handle to be inadvertently positioned in the gear up position even though the airplane is on the ground.

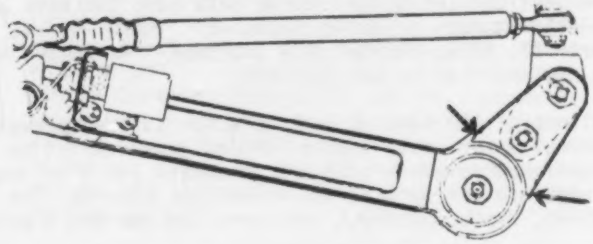
Some of the reports stated that the material used in the solenoid plungers is relatively soft and easily deformed. The returning of the gear handle to neutral by hydraulic pressure and/or manual pressure applied by the operator are suspected causes of plunger deformation.

A review of the Piper PA-31-350 data revealed three incident reports listing the landing gear handle safety solenoid as the causal factor. In all three incidents the airplane was in ground taxi mode, the operator moved the landing gear handle from neutral to gear down position to perform the hydraulic pump operational check, and one or more of the landing gear subsequently retracted.

NOTE: This article was published in Alerts No. 79 dated February 1985. There was another recent report of gear collapse during engine ground run. Investigation revealed the solenoid was bent. One submitter advised the condition of the pin is difficult to determine while the solenoid is installed.



KNOWLEDGE IS ONE THING THAT DOESN'T BECOME SECONDHAND WHEN USED.

Piper Model PA-31T2	Nosegear Steering Problems	The pilot reported the rudder pedals were stiff with limited nosewheel turning radius and rudder travel. Investigation disclosed the P/N 47134-00 bracket assembly and the P/N 47080-00 shaft were bonded together with corrosion and dirt. Lack of oil, winter operation on sanded runways, and aircraft infrequent use were listed as contributing to the component malfunction. The submitter suggests cleaning and lubricating the shaft and bracket during every inspection.
Piper Model PA-34-200	Fitting Assembly P/N 67040-12	The left forward trunnion fitting broke. The fitting broke where it was bolted to the spar. Side loads during landing in high wind gusts may have contributed to the problem. A related article was published in Alerts No. 77 dated December 1984.
Piper Model PA-42	Gear Side Brace P/N 57448-02 and -03	Both ears of the left brace broke when the gear was retracted. Inspection of the part revealed evidence of a previous crack in the radius. The submitter indicates the manufacturer could improve the part by increasing the radius in the actuator attach slot. 

ACCESSORIES

BENDIX

Bendix Magneto Model D4RN-3000	Cam Retaining Screw P/N 10-391213	The cam retaining the screw was replaced. The replacement screw was 5/8-inches long. Bendix Master Service Manual lists the screw length as 3/4-inch. A call to Bendix and a check of the engineering specifications confirmed the screw length to be 3/4-inch. The length was increased from 5/8-inch to 3/4-inch in 1980 with no change in part number. The submitter advises that when installing the cam retaining screw, make sure the length is 3/4-inch.

SLICK

Slick Magneto Model 4251	Coil Assembly P/N M3114	The engine failed when the left magneto was selected during engine check. Investigation revealed an open secondary coil. Further investigation disclosed the P/N M3006 end bearing was fretted which allowed the rotating magnet to contact the pole shoes. The magneto was replaced under Cessna Warranty. The submitter advised this was the third warranty magneto replacement on the 1985 Cessna aircraft.

Slick Magneto Model 6220	Distributor Block Moisture	The left engine on a Cessna 340A began running rough after the aircraft was flown through heavy rain. Disassembly of the left magneto revealed water, corrosion, burned points, and worn bushings allowing the distributor gear finger to hit the ignition lead contacts. The right magneto failed on a later flight from the same cause. A carbon track from the distributor gear axle allowed crossfiring which caused a burn through of the number 3 piston. Evidently there is insufficient air pressure inside the pressurized magnetos to prevent water entry. The submitter recommends sealing the ignition leads and distributor cap screws with RTV and also recommends a mandatory 500-hour servicing of 4200 and 6200 series magnetos.

ENGINES

GARRETT

Garrett Model TPE331 Series	Fuel Pump External Leakage

There have been 163 reported instances of fuel pump external leakage from 1976 through September 30, 1985. Such leakage incidents, resulting from "O-ring" seal deterioration at the high pressure fuel pump split line, have occurred on virtually all TPE331 models and fuel pump configurations. Service times on pumps with reported leaks ranged from 2 hours to 9,543 hours and averaged 1,650 hours.

One incident of serious leakage occurred on a TPE331-8 engine installed in a Cessna Conquest aircraft. This incident resulted in a nacelle fire which was promptly extinguished and the engine was sent to Garrett Turbine Engine Company (GTEC) for examination. The engine fuel control/pump support bracket was found broken; bench tests indicated a leak of 200 pounds per hour at 250 psig and 65 percent r.p.m. Disassembly revealed loose bolts and mounting studs in the pump-control stack. The loose assembly allowed the "O-ring" seal at the high pressure pump parting surfaces to be extruded into the flange gap which allowed the large fuel leak. The condition of the pump-control stack was attributed to strong vibratory response due to the broken bracket and the installation environment of this specific aircraft. The fire incident occurred at 969 hours. The support bracket had been replaced at 898 hours due to bracket failure. The pump-control stack had previously been replaced at 400 hours due to a failed bracket mount attach point.

GTEC has determined by tests that flexure of the pump flange can occur with relief valve pressure of 1,375 psi which is experienced briefly during each engine shutdown. Repeated applications of this pressure induced "O-ring" nibbling which progressively increased until small leaks occurred. It is noted that in-service observations of fuel leakage have typically been reported during engine starts. Alternate "O-ring" materials were evaluated using pressure cycling bench testing procedures. A fluorocarbon material "O-ring" design yielded substantial improvement in leakage prevention. GTEC plans that FAA substantiation tests of this new design will be completed shortly. On successful completion, GTEC will make the fluorocarbon "O-ring" available for retrofit and will recommend its installation at first access. GTEC plans to issue a service bulletin to this effect within 30 days from FAA approval of this design change.

ADVISORY CIRCULAR 43-9B, MAINTENANCE RECORDS, DISCUSSES MAINTENANCE RECORD REQUIREMENTS UNDER FAR'S 43.9, 43.11, AND 91.173 AND THE RELATED RESPONSIBILITIES OF OWNERS, OPERATORS, AND PERSONS PERFORMING MAINTENANCE, PREVENTIVE MAINTENANCE, AND ALTERATIONS.

CONTINENTAL

Continental Models IO-520-B, -BA, -BB, -C, -CB, -M, -MB, -N, -NB TSIO-520-B, -BB, -BE, -D, -DB, -E, -EB, -J, -JB, -K, -KB, -L, -LB, -N, -NB, -U, -UB, -VB, -WB	Camshaft TCM P/N 629726	There have been several reports of camshaft failures (P/N 629726). These failures have occurred in the corner radius of the oil transfer groove in the rear cam bearing. It has further been reported that some overhaul facilities are not performing engine overhauls in accordance with current TCM Overhaul Manuals. Overhaul Manual X30039A for the IO-520 engine dated March 1982 (current revision level is dated January 1985), Overhaul Manual X30042A for the TSIO-520 engine dated February 1982 (current revision level is dated August 1982), and Overhaul Manual X30574A for TSIO-520 Permold Series engines dated July 1985 all require inspections of the corner radius and give limits for cam reuse. Shot peening may also be required. The submitter recommends that these procedures be followed the next time the crankcase halves are separated but no later than the next engine overhaul.
Continental Model TSIO-520	Air/Oil Separator Screen P/N 0850694-5	The engine would not turn forward during an inspection. Investigation revealed the oil scavenger pump was frozen by 3/8 to 3/4-inch steel strands. Further investigation disclosed the steel strands came from fragmentation of the air/oil separator screen. Interrogation of the Service Difficulty Reports (SDR'S) System produced 22 records of failed oil scavenge pumps. None of these records specifically identified contamination of wire particles from the air/oil separator. However, 21 of the records cited cracked pump housing, and a majority of these 21 records also reported broken gears. The number of oil scavenge pump failures suggests that fragmentation of the air/oil separator screen may be a probable cause for oil scavenge pump gear failures and housing cracks. The submitter suggests more frequent inspections of the air/oil separator for possible fragmentation.
Continental Model TSIO-520-R	Fuel Filter	The fuel flow began to decrease during cruise flight in a Cessna T210N. A full rich mixture was required to obtain proper fuel flow. The fuel pump was replaced in accordance with TCM Service Bulletin No. 86-4. Full throttle fuel flow could not be obtained with the new pump. The fuel control inlet screen, flow divider screen, and injector nozzles were found coated with a fine powdery substance. Fuel flow was normal after cleaning the screens and injectors. The submitter recommends the Service Bulletin be revised to include downstream cleaning.

Continental Model TSIO-520-UB	Turbocharger Inlet Assembly P/N 642668	The turbocharger inlet assembly was found cracked on the inboard side. The crack was from the turbo flange upwards for approximately 3 inches. Part total time--588 hours.

LYCOMING

Lycoming Model LTIO-540-F2BD	Engine Oil Dipstick P/N LW14728	The locking mechanism on this type oil dipstick requires the lock lever to be in the horizontal position. Most operators are not aware that pushing down on the lock lever beyond the horizontal position unlocks the dipstick and allows loss of oil in flight. The submitter recommends replacing this type dipstick with a screw-in type. Alternatively, there should be a stop fabricated in the filler neck to prevent the lock from being pushed beyond the horizontal position.

BE AWARE

FUEL CAP SEALS

Investigation of an aircraft accident revealed evidence of water in the aircraft fuel system. Further investigation revealed that in the previous month water had been found in one main (tip) tank. Since the aircraft was not hangared during wet weather, the operator had the large "O" rings on all four of the aircraft's fuel caps replaced.

The pilot stated that he consistently checked the fuel tank sumps on each morning preflight and after each refueling. He volunteered that on the two morning preflights prior to the mishap he had removed, using a tube-type checker, more than one tube full of water from each auxiliary tank. When the fuel caps were disassembled, the inner "O" rings on the cap posts were found to be worn beyond the capability of sealing. The aircraft had accrued 918 flying hours since manufacture in 1980.

The Gabb-type fuel cap is common to many aircraft. It has a recess containing a flip-up handle, mounted on a rotating center post, which operates the locking fingers used to lock and unlock the cap in the fuel filler assembly. The filler assembly is mounted in a well on the upper surface of each fuel tank. Water can readily collect in both recesses, and unless properly-sealing "O" rings are installed on both the cap perimeter and the cap center post, water may enter the tank from either location.

The large "O" rings on the perimeter of the caps, which seal out water from the filler assembly recess, are readily viewable during refueling and preflight inspections and are commonly replaced when indications of deterioration are noted. The small, inner "O" rings on the cap center posts, designed to prevent water intrusion from the handle recess in the cap, cannot be seen without disassembling the cap. As a consequence, replacement of these "O" rings is not common practice. Of the affected make/model aircraft, only the Piper Aerostar manuals are known to contain specific information relating to maintenance of Gabb-type fuel cap seals.

The submitter recommends replacing both "O" rings on this type fuel cap whenever conditions merit replacement of either "O" ring.

SAFETY IS NEVER SIGNING OFF ANYTHING YOU HAVEN'T REALLY
LOOKED AT - AND WOULDN'T FLY IN YOURSELF

MAINTENANCE NOTES

METAL PROPELLER--USE AND CARE

There have been recent reports of portions of propellers separating during flight.

Your aircraft propeller has been manufactured from a high-strength, heat-treated forging under closely controlled conditions to the approved design in accordance with the applicable FAA regulations. Stamped on the propeller hub face are the model, serial number, type, and production certificate numbers. The following are some DO's and DO NOT's that one manufacturer has published for guidance in helping to assure proper use and care of metal propellers.

DO

1. Make a complete preflight and postflight inspection of blades for nicks, scratches, erosion, stone bruises, and cracks. Look at and feel the surface.

2. Have any minor damage repaired at once by qualified personnel in accordance with Advisory Circular 43.13-1A, Acceptable Methods, Techniques and Practices--Aircraft Inspection and Repair, and the manufacturer's metal propeller repair manual.

3. Clean propeller blades frequently with a nonoil base solvent (Stoddard) or equivalent. Never use an alkaline cleaner.

4. Protect propeller blades from moisture and corrosives by wiping with a cloth dampened with oil or by waxing the blades with an automative type paste wax.

5. Conform to applicable RPM placard limitations and periodically have tachometer checked for accuracy.

6. Have all major repairs and reconditioning done by an FAA certificated propeller repair station or by the factory. This will assure you that the correct repair procedures are followed.

7. Have your propeller completely reconditioned after extensive flight time (provided it has not received prior damage requiring more frequent attention).

8. Replace your propeller when there is any question as to its airworthiness. To avoid interruption in aircraft use, consider having a spare unit which can be installed while the other one is being inspected and/or repaired. Check with manufacturers for recommended times.

9. Be sure that proper bolt torque is applied evenly when installing a propeller. See decal on blade or refer to manufacturer's maintenance manual.

DO NOT

1. Use your propeller under any circumstances without a thorough inspection by qualified personnel if it has been subjected to impact.

2. Have your propeller straightened except by qualified personnel. Even partial straightening of blades for convenience of shipping to a repair station may cause hidden damage which, if not detected, could result in a nonairworthy propeller being returned to service. Be sure to report anything of this nature before repair is initiated.

3. Repair blade defects by peening or welding. This induces premature failure and is not permissible.

4. Paint over corroded or damaged blades. This hides the defect and may deter needed correction.

5. Run up your engine/prop in areas containing loose stones and gravel.

6. Push or pull on the propeller when moving the aircraft by hand.

7. Install a propeller on your aircraft unless it is the model approved under the aircraft type or supplemental type certificate and has been obtained from a reliable source. A used propeller of unknown service history may be no bargain.

STICKING VALVES--DO NOT NEGLECT THE WARNING SIGNS

One of the regional service managers at the Lycoming factory indicated that his experience over the years included working on engines with sticking valves. He commented that the engine will almost always provide a warning by running very rough at start up. As the engine warms up, it may then smooth out after a few seconds and run normally, but the initial roughness is a warning that preventive maintenance action is required.

Just a few days after these comments were made, a conversation with an aircraft owner confirmed that the regional manager's comments were right on target. This is the very story which the aircraft owner related.

An aircraft had been purchased recently and the owner flew it to altitude in the vicinity of his home airport to satisfy himself of the aircrafts capability to fly over mountainous terrain during a planned vacation trip. Content that the aircraft and engine were capable of meeting his requirements, the vacation trip was undertaken. All went smoothly on the first 300-mile leg of the trip which ended with a planned overnight stop.

When the engine was started the next day, it was very, very rough, but smoothed out and ran normally after a short time. With the engine running smoothly, the vacation trip continued to its destination. The aircraft was then tied down and not operated until it was time for the return trip . . . a period of about 1 week.

As the engine was started for the return trip, it again gave indications that a valve was momentarily sticking . . . it ran very rough for several seconds, but then smoothed out. With the engine running smoothly again, the return trip was started. After 1 to 2 hours of flight at altitude, over mountainous terrain, the engine ran very rough again for a short period of time and then smoothed out. The pilot decided to land at the nearest airport.

Examination of the engine revealed a considerable amount of oil leakage. The cause . . . a valve which had stuck solidly caused the pushrod to bend. This bending ruptured the pushrod shroud tube and allowed oil to escape. This is a classic example of the damage which sticking valves can cause.

The lesson to be learned is quite simple. Do not neglect the warning signs. Perhaps the experience related here will allow others to recognize a rough running engine at start up as a possible indication of sticking valves. The next step is to take immediate action to prevent damage.

Although there may be an occasional exception, it is almost always an exhaust valve which sticks. To prevent further valve sticking and to reduce the possibility of damage, all exhaust valve guides should be cleaned of any carbon, varnish, or other contamination buildup. This is accomplished by reaming the guides to their original size as specified in AVCO Lycoming Publication SSP 1776, Table of Limits. AVCO Lycoming Service Instruction 1425 provides recommendations to reduce the possibility of valve sticking. In particular, Part III of the instruction gives a procedure for reaming valve guides which can be accomplished without removing the engine from the aircraft or the cylinders from the engine.

NOTE: The above article was excerpted from the AVCO Lycoming "Flyer," dated May 1983 and was published in Alerts No. 85 dated August 1985. There have been additional reports of bent pushrods and oil leakage which the submitters believe could have been prevented had the maintenance procedures in Lycoming SI No. 1425 been followed.

One submitter advised that sticking valves has been a constant problem since the introduction of the 1/2-inch diameter exhaust valve in 1967. He advised that Lycoming Service Bulletin (SB) No. 388A addresses the problem but the SB was not mentioned in Alert No. 85. He suggests that Lycoming SB No. 388A be made an airworthiness directive with compliance time each 500 hours or annually to solve the sticking valve problem.

HARDWARE MISAPPLICATION

A repair station reported finding AN526 low carbon steel machine screws in use where a NAS 221 machine screw should have been. The AN526 screws are being found in many different aircraft in seat rails, baggage shelf mounting, avionics mounting racks, and securing adel clamps on wire bundles and hoses.

☆ U.S. Government Printing Office: 1986—491-810/20782

U.S. Department
of Transportation

Federal Aviation
Administration

Aviation Standards National Field Office
P. O. Box 26460
Oklahoma City, Oklahoma 73125

AVN-110

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AC No. 43-16

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ALERTS

ALERT NO. 97
AUGUST 1986

Improve Reliability-Interchange Service Experience

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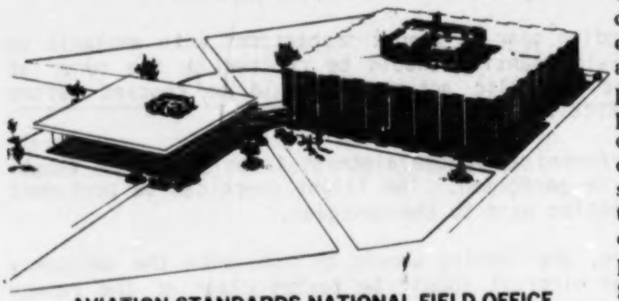
ADVISORY CIRCULAR
AC 43-16

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C. 20590

GENERAL AVIATION AIRWORTHINESS ALERTS

AUGUST 1986



AVIATION STANDARDS NATIONAL FIELD OFFICE
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The General Aviation Airworthiness Alerts provide a common communication channel through which the aviation community can economically interchange service experience and thereby cooperate in the improvement of aeronautical product durability, reliability, and safety. This publication is prepared from information submitted by those of you who operate and maintain civil aeronautical products. The contents include items that have been reported to be significant, but which have not been evaluated fully by the time the material went to press. As additional facts such as cause and corrective action are identified, the data will be published in subsequent issues of the Alerts. This procedure gives Alerts readers prompt notice of conditions reported via Malfunction or Defect Reports. Your comments and suggestions for improvement are always welcome. Send to: Aviation Standards National Field Office, Attn: AVN-110, P.O. Box 26460, Oklahoma City, Oklahoma 73125.

AIRCRAFT

BEECH

Beech Model 58	Taxi Light	A high failure rate of the taxi light had been experienced for several years. Numerous efforts to correct the problem had failed. The operator finally modified the mount so the filament would be vertical instead of horizontal. This change greatly extended the service life of the lamp.
Beech Model 58P	Skin Cracks	The skin in the rear fuselage, under the door seal pump attachment, was found cracked. The submitter advised this skin cracking problem pertains to most Model 58P aircraft. Time on reported aircraft -- 411 hours.

NOTICE TO READERS: The General Aviation Airworthiness Alerts are, for the most part, prepared from information supplied by those who operate and maintain aircraft. The FAA encourages the reporting of all malfunctions or defects that come to the attention of service or operating personnel, even though the problem has been previously reported. The Malfunction or Defect Report, FAA Form 8010-4, which supersedes FAA Form 8330-2, is available from the local General Aviation District Office, and may be used for reporting purposes.

BELLANCA

Bellanca Model 17-31ATC	Gear Hydraulic Pump Motor	

The hydraulic pump failed when the gear was selected down for landing. The nosegear failed to extend properly when the emergency extension system was actuated. Teardown of the hydraulic pump motor revealed the brushes were worn so badly that one brush had only the spring and pigtail from the brush wire. The submitter recommended the following action to prevent future landing gear malfunctions.

1. Hydraulic pump motor overhaul at 400-500 hours, depending on the type of use, sooner if aircraft is flown only on short hops where the gear is cycled more than twice per hour.

2. Particular attention is to be paid to the landing gear at annual inspections with emphasis on proper lubrication and adjustment. Hydraulic fluid quantity should be checked by the owner at regular intervals. Any leakage observed at the hydraulic actuators should be checked before flight, and maintenance performed as soon as practical.

3. Proper emergency gear extension should be performed while the aircraft is on jacks. A flight check of the emergency gear extension should also be performed. The flight check can be performed by the owner or an authorized individual with attention paid to the nosegear.

4. If the aircraft suffers hydraulic pump failure, the landing should be made with the emergency geardown lever in the open or down position. The aircraft should be taxied clear of the runway and overcenter locks should be installed in the maingear before moving the aircraft.

5. Installation of a backup hydraulic pump such as the ones used on Cessna single-engine aircraft with retractable landing gear.

CESSNA

Cessna Models 150 and 152	Frayed Cables	Initial visual inspection of the rudder cables while still hooked up showed no faults. However, when the rudder cables were disconnected at the rudder pedal assembly and pulled back and out through the fuselage rear cable exit, both cables were found to be severely frayed in the area that passes over the rear pulley. This condition was found on several aircraft with times from 1,964 through 5,363 hours.
Cessna Model 170A	Gear Bracket P/N 0511495-3	The outboard right landing gear bracket was found severely corroded and cracked in the forward outboard radius. A thorough inspection of Cessna 170, 180, and 185 models with this type bracket installation was suggested, especially on the side with the exhaust outlet. The submitter advised the forward gear wedge should be removed for proper inspection.

PATIENCE IS SOMETHING YOU ADMIRE IN THE AIRCRAFT PILOT TAXIING BEHIND YOU - BUT CAN'T TOLERATE IN THE AIRCRAFT PILOT IN FRONT OF YOU.

Cessna Model 172	Fuel Selector Valve	Placing the fuel selector valve in the off position does not always shut off the fuel flow. The reporting mechanic advised this occurs in nearly one-half of the Cessna 172 aircraft he inspects. A positive fuel shutoff requires moving the selector valve past the detent from the left or right tank placard and then returning it to the off position. The submitter advises this could be a serious problem in the event of an inflight fire. **NOTE:** This article was published in Alerts No. 90 dated January 1986. A recent report advised the fuel selector would not provide positive fuel cutoff in any position. Installation of a new unit solved the problem. The submitter suggested checking all installed fuel selectors for positive fuel shut off.
Cessna Model 172RG	Gear Actuator Bolt P/N NAS464P5LA29	The bolt in the right gear actuator assembly was found partially backed out of the bolthole. This was the third time the bolt had been found backing out. The submitter recommends a drilled head bolt and safety wire to solve the problem. **NOTE:** This article was published in Alerts No. 84 dated July 1985. There were recent reports of finding the bolts loose on three Cessna aircraft while performing annual inspections. The aircraft were a 177RG, a P210, and a T210L.
Cessna Model 182	Carburetor Heat Valve Loose	The carburetor heat butterfly valve was found loose during an annual inspection. The valve was loose on the shaft assembly at the rivet attach point. The rivets were replaced with steel screws and nuts. The submitter advised this was the third aircraft recently found with this condition and recommended a detailed inspection of the valve assembly at each 100-hour inspection. Part total time -- 142 hours.
Cessna Model TR182	Chafed Hydraulic Line P/N 2280001-13	The gear would not extend when selected down and the hydraulic pump cycled on and off. The gear was extended manually. Investigation revealed the hydraulic line from the pump to the selector valve was chafed through by the throttle cable. The hydraulic fluid was lost through the hole chafed into the line. Aircraft time -- 625 hours.
Cessna Model 203	Chain Guard Screw	The autopilot roll actuator mount has a chain guard that is held by a 6-32 screw safety wired to a second screw on the opposite side of the sprocket. The screw stripped out and was hanging by the safety wire. Inspection of the screw revealed only two threads had been engaged. A longer screw was installed as a replacement.

Cessna
Model 172RG,
R182, FR182,
210, and 337
Series

Nosegear Actuator
Spring Guide,
P/N 1280206-1

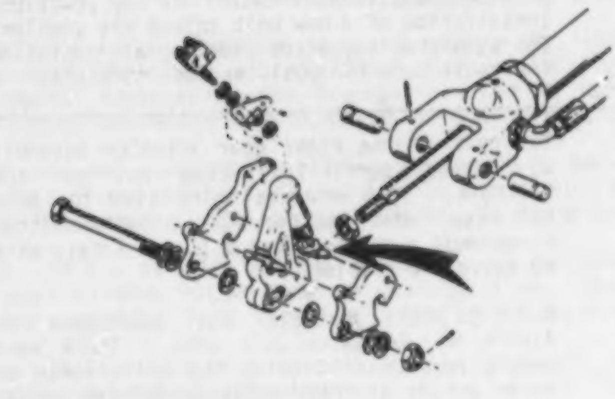
Numerous reports indicate the ears have been found broken on this nonmetallic part. The unusual result of this failure is that the nosegear will not lock in the down position.

A new spring guide made of 4130 steel is now available from Cessna and is identified by P/N 9882024-1. Cessna Service Information Letter No. SE84-3 has been issued and pertains to this new part.

The submitter recommends the nonmetallic parts be checked at each scheduled inspection until replaced with the new steel spring guide.

NOTE: The recent report indicates the nosegear failed to lock down on a Cessna T210. The P/N 1280206-1 actuator spring guide failed. A recent submitter advised he had seen two C210 nosegears collapse while unattended on the ramp. Each aircraft had the nonmetallic actuator spring guide which had broken. This submitter recommends replacing the P/N 1280206-1 spring guide with the improved P/N 9882024-1 spring guide. Similar articles have been published several times in the Alerts. Reports continue to be received of problems caused by the nonmetallic spring guide. A recent report was on a Cessna 172RG and this submitter also recommended replacing the nonmetallic part with the improved spring guide P/N 9882024-1 before the part breaks causing a nosegear collapse. Cessna Service Information Letter No. SE84-3 contains replacement information.

NOSE GEAR
DOWNLOCK
MECHANISM



Cessna
Model 208

Loose Sensor

The attachment nut that holds the low fuel warning sensor was found loose. This allowed the sensor to fall to the bottom of the tank. This condition was found on two separate aircraft during fuel tank modification. The submitter advised there was no locking means on the attachment nuts.

Cessna
Model 208A

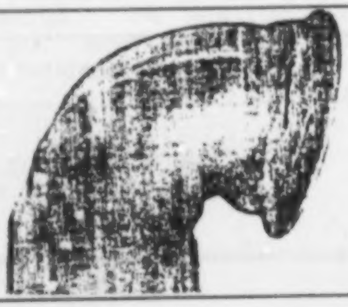
Chafed Control Rods

Inspection of the flap control rods revealed the rods were chafing the lightening holes. The inspection was made through the wing inspection plate forward of the flap area. Both rods were severely worn. The flaps must be in the down position to inspect for this condition. Six out of eight aircraft inspected were found with chafed rods.

Cessna
Model 340A

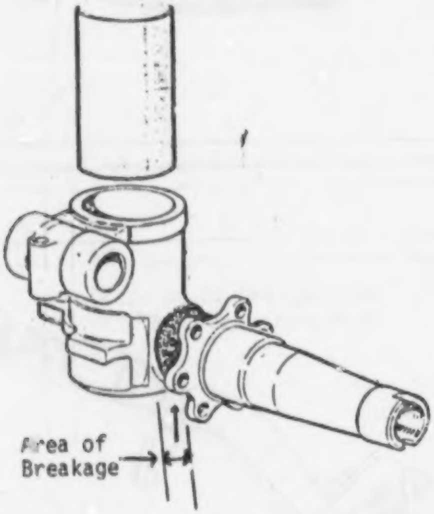
Turbocharger Exhaust
Header

The turbocharger exhaust headers on both engines were found bulged and cracked at the wastegate flange area. This area is difficult to inspect without removal of the wastegate assembly. The left engine wastegate elbow was found bulged and cracked. Time on the exhaust system -- 1,407 hours.



Cessna Model 402B	Heater Fuel Pump	The submitter is aware of the fuel pump diaphragm rupturing in four separate pumps. A ruptured diaphragm allows raw fuel to flow through the pump shaft bushing, into the shroud, and then overboard. There have been instances of the shroud leaking fuel into the nose section which causes fuel fumes in the cockpit. The submitter advised there is no part number for a replacement diaphragm. There is a seal kit for the pump, but it does not include the diaphragm. Time on the failed diaphragm was not given.

EMBRAER

Embraer Model 110P1	Maingear Axle Cracked 	A crack indication was found on the right maingear axle support. The crack was in the area indicated in Embraer Service Newsletter No. 39. This was the second occurrence of a crack in this area found by the submitter. The following was excerpted from Service Letter No. 39. The area affected is between the brake attaching flange and the piston tube, as shown in the diagram. The axle appeared to have had an existing crack located on the lower portion. Until further information is available, we are suggesting that all operators inspect for cracks in the area in question at the next convenient opportunity, such as wheel removal. Please note that in order to make a satisfactory inspection, the brake assembly should be removed, but not to the extent of undoing the hydraulic lines. The same inspection is also recommended during a hard landing inspection procedure.

FAIRCHILD

Fairchild Model SA26-AT	Aileron and Elevator Spar Areas	There was no indication in the aircraft maintenance records of Fairchild Service Bulletin (SB) No. 26-27-00-26 ever being accomplished. The reason for the SB was to detect possible cracks in the aileron and elevator hinge attach area. The initial inspection should have been accomplished 2,000 hours previously. Both elevator spars were found severely cracked and corroded. This SB is not on the factory inspection program and is not FAA mandatory. The submitter suggests that the SB be made a part of the factory inspection program or an airworthiness directive to ensure unairworthy control surfaces are detected and repaired.

Fairchild
Model SA227-AC

Shorted Audio
Control Panels

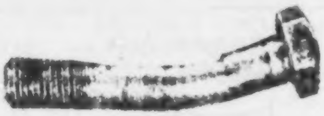
The No. 1 and No. 2 audio control panels were shorted internally from fine metal particles on the circuit boards. Investigation disclosed the exterior case of the unit had been chafing on the glareshield creating the metal particles. All such audio panels in the operator's fleet were given anti-chafe protection.

MAULE

Maule
Model M5-235C

Bent Bolt
P/N AN6-17

The left upper shock strut bolt was found bent and partially sheared. Repeated hard landings may have been the cause. The submitter advised that a thorough visual inspection requires removal of the cabin floor, the dust boot, and the bolt.

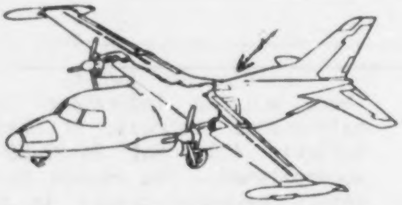


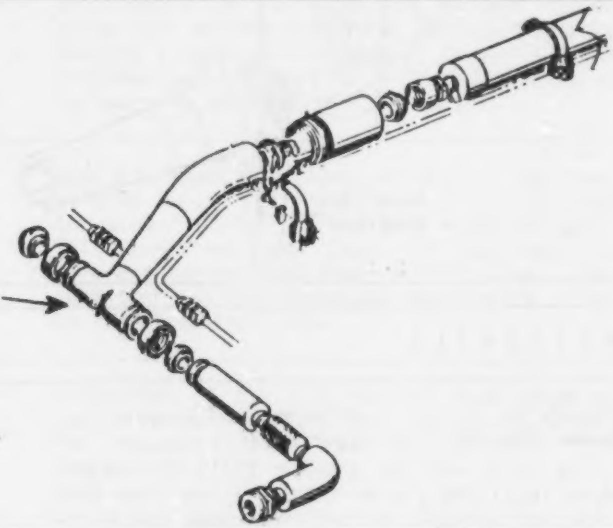
MITSUBISHI

Mitsubishi
Model MU-2B-35

Bleed Air Tube

While deplaning after a trip, a passenger noticed the aircraft skin at the right aft upper side of the cabin door was extremely hot. Investigation revealed a 2-inch crack in the bleed air tube. The tube assembly is covered with a cloth-type heat shielding and is in an area that is not subject to 100-hour inspections. Aircraft time -- 1,386 hours.

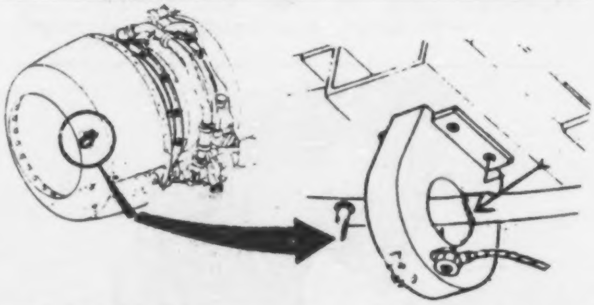




Mitsubushi
Model MU-300

Starter-Generator
Wires Chafing

During compliance with Mitsubushi Aircraft International Service Bulletin 24-008, it was discovered that both wires were damaged by chafing on the sides of the current sensors. The wires were repaired, spiral wrapped, and rerouted to prevent damage in the future. The submitter suggests checking for chafing, installing spiral wrap, and rerouting to prevent damage. Aircraft time -- 13 hours.



MOONEY

Mooney Model M20F	Rod End Bearings P/N 914012-015	Elevator control was lost just after lift-off and the aircraft was landed. Investigation revealed the elevator control rod end had broken in the threaded area. The rod end bearing was frozen and corroded. The submitter recommended a grease fitting in the rod ends and frequent inspections.
Mooney Model M20K	Plugged Drain Holes	Approximately 3 cups of fuel and water were found trapped in the wing due to plugged drain holes. This condition was found when complying with Airworthiness Directive 85-24-03 using the instructions contained in Mooney Service Bulletin (SB) M20-230. The SB did not include instructions to remove the most inboard fuel tank access cover. The drain holes were plugged in the rear stringer between W.S. 24.50 and W.S. 43.50. Aircraft time -- 677 hours.

PILATUS AIRCRAFT LTD.

Pilatus Model PC-6 Porter & Turbo-Porter up to S/N 841	Cracking of the Electric Trim Actuator Attachment Bracket	Pilatus Aircraft Ltd. (Switzerland) has issued Service Bulletin No. 147 dated May 1985 and Fairchild Republic Co. has issued Service Letter SL PC6-27-4 dated 30 September 1985 to inspect the electric trim actuator attachment bracket for cracks. In case cracks are found, replace the defective bracket. Contact the U.S. representative or Fairchild Republic Co., Hagerstown, MD 21740 to obtain repair instructions.

S. O. C. A. T. A.

S.O.C.A.T.A. Model Rallye MS800 and 100 Series Airplanes	Forward Side Attachment Fittings and Horizontal Stabilizer Spar	S.O.C.A.T.A. issued Mandatory Service Bulletin No. 145, dated December 1985, to inspect for cracks and fit on the forward side attachment fittings and horizontal stabilizer spar every 100 hours time-in-service. No repair information was given. The submitter recommends the aircraft be inspected, and if cracks are found, contact the U.S. representative for S.O.C.A.T.A. to obtain repair instructions.

Washington National Airport opened for full operation on June 16, 1941.

P I P E R

Piper Model PA-24-250	Sheared Stop	The nose steering stop was found sheared off during an inspection. Exceeding the turn limits while ground handling with a tractor and tow bar caused the sheared stop. Ground personnel should exercise caution while moving aircraft, especially with a tug and tow bar.
Piper Model PA-28-140	Corrosion and Wear	A hole was found corroded through the battery box on the aft side below the lid. The battery box aft support channel was severely corroded. The rear spar steel fitting was heavily rusted. The Teflon lining in the piano hinge loops of all aileron hinges was worn out. The outboard hinges on each end of the stabilator tab were badly worn. All the items were found during an annual inspection on a 6,080-hour aircraft.
Piper Model PA-28-181	Broken Trim Cable	The left forward trim cable broke in flight. The aircraft was landed with heavy stick pressure. The cable was found severed at the trim servo wheel. This condition has been found on other Piper aircraft with electric trim installed. The trim wheel was worn which was a possible cause of the frayed cable. The submitter recommends periodic inspections of both components.
Piper Model PA-34-200	Alternator Brush Holder	The pilot reported the left alternator was inoperative. Investigation revealed worn brushes. New brushes were installed, but the alternator was still inoperative. After many hours of trouble shooting, the rivet head on the new brush holder was found broken which allowed for an open ground. Soldering the rivet to ground solved the problem. Two other brush holders in stock appeared to have a good rivet head, but when pressure was applied, the head popped off leaving the same open ground condition.

Piper
Model PA-34-200T

Corroded Aileron
Hinge

Maintenance personnel found a longitudinal crack in one hinge bearing cap during a preflight inspection. Further inspection revealed all six aileron hinges were severely corroded.

N O T E: This article was published in Alerts No. 79 dated February 1985. There was a recent report of replacing all six aileron hinge brackets because of severe corrosion. This submitter suggests a thorough inspection of the area during each 100-hour inspection.

ACCESSORIES

FACET AEROSPACE PRODUCTS COMPANY

Facet Carburetor Floats

Airworthiness Directive (AD) 66-05-04 has been revoked. This AD required that composite material floats be installed in Marvel Schebler carburetors in place of metal floats. Facet (Marvel Schebler) has determined that the composite floats are not compatible with certain low lead fuels and has discontinued their manufacture in favor of a redesigned metal float. Facet recommends that with any indication of an excessively rich running engine or at the next carburetor or engine overhaul, the redesigned metal floats be installed. Neither the original metal float nor the composite float (if either is still available) should be utilized for replacement. The redesigned metal float part numbers are:

P/N 30766	For all Model MA3 and MA4 carburetor series (Supplied as part of Kit No. 666-915)
P/N 30764	For all Model MA4-5, MA5, and MA6 carburetor series (Supplied as part of Kit No. 666-916)
P/N 30768	For all Model HA6 carburetor series (Supplied as part of Kit No. 666-917)

Facet Aerospace Service Bulletin No. A1-84A applies to the carburetor floats in all Marvel Schebler aircraft carburetors.

The Service Bulletin indicates the carburetor should have the approved metal float already installed when:

1. It has an MF stamped or etched on the lower portion of the Marvel Schebler nameplate.
2. It has a Facet Aerospace nameplate.

NOTE: This article was published in Alerts No. 88 dated November 1985. This reprint was prompted by a recent malfunction or defect report submitted by a mechanic whose airplane barely made it back to the airport because of an extremely rough, rich-running engine. This submitter suggests all plastic floats be replaced immediately with possible airworthiness directive action to ensure replacement.

PRESTOLITE

Prestolite Alternator Model ALX 9425B	Incorrect Information	During reassembly of the alternator, the rotor shaft threads were destroyed when an attempt was made to torque the nut to 37-41 ft./lbs. This was the torque value listed in Piper Service Manual 761 751 and Prestolite Manual OE-A1. Teledyne Continental Manual X3003A listed the correct torque of 175-200 in./lbs. The submitter informed Piper and Prestolite of the incorrect information and was advised the service manuals will be corrected.

AC 43-12A, Preventive Maintenance provides information concerning preventive maintenance, who may perform it, the standards of performance applicable to it, authority for approving aircraft for return to service, and the applicable recording requirements. It also clarifies those areas most frequently misunderstood in the past, and explains the recent changes in the rules concerning preventive maintenance. AC 43-12A, Preventive Maintenance may be obtained from: U.S. Department of Transportation, Subsequent Distribution Section, M-494.3, Washington, D.C., 20590.

INSTRUMENTS

UNITED INSTRUMENTS, INC.

United Instruments Altimeters P/N 5934	Altimeter Set Knob	In adjusting the barometric pressure window setting, using the altimeter set knob, the operator can inadvertently disengage the barometric scale. This will reset the altimeter to an erroneous setting. The altimeter calibration accomplished in the instrument shop is no longer accurate. The altimeter could be off several hundred feet. This condition was found on new instruments, in stock, as well as those in service. Two repair stations reported this same condition in 1 day. One repair station estimated 60 percent of their United Instrument altimeters in the 5934 series had failed in this manner. Some of the failed altimeters appear to be in the not-all-inclusive serial number range of 9C750 through 3D000. Airworthiness Directive 86-05-02 has been issued pertaining to the problem. **NOTE:** Since this article was published in Alerts No. 95 dated June 1986, there have been reports of finding defective altimeters outside the above serial number range.

ENGINES

CONTINENTAL

Continental Model TSIO-520-VB	Engine Problems	There have been five recent reports citing cracked cylinders which resulted in separation at the cylinder head during cruise. These reports were all on different aircraft with an average engine time of 203 hours. Three other reports disclosed an intake valve installed in an exhaust port, improperly installed exhaust valve keeper, and the wrong push rod installed in a cylinder. All the engines were remanufactured between the first of September and the end of November 1985.

Hot weather problems:

Reduction in aircraft performance - extra takeoff distance required.

Bugs in pitot tubes, static and tank vents - use pitot covers.

Tanks filled with cold fuel will overflow as the fuel warms.

High temperature in parked aircraft can damage avionic equipment.

Continental Model TS10-520 Series	Oil Dipstick P/N 633233	There have been many reports of the oil dipstick falling into the engine. The four metal locktabs holding the dipstick to the cap corrode away, allowing the dipstick and the remaining portion of the tabs to fall into the oil sump. The spring tension on the oil cap is also lost, with the possibility of the cap vibrating off. The most recent reports have been on engines with 450 and 960 hours. **NOTE:** The above article appeared in Alerts No. 23, dated June 1980, and in No. 66 dated January 1984. There have been other articles regarding the problem published in the Alerts. One report recommended constructing the locking tab assembly of stainless steel. A recent report was on an engine with 1,024 hours. This submitter suggested replacing the dipstick at 1,000 hours or devising some method of repairing the locktabs.

GARRETT

Garrett Model TPE-331	Oil Filters Crushed	Upon removal of the oil filter housings, both filters were found crushed on one end. Pieces of paper and metal were missing from each filter. Time on the filters -- 100 hours.
Garrett Model TPE-331	Oil Filters P/N 76149	There were high oil pressure indications for the left engine on a Fairchild SA 227-AC. Investigation revealed the oil filter had collapsed, and a portion had torn out and lodged in a port downstream of the filter. Part total time -- 102 hours.

PROPELLERS

HARTZELL

Hartzell Model HC-E2YR-1BF	Cracked Blade	The owner of a Gulfstream Aerospace 112TC found a cracked propeller blade during a preflight inspection. The 3-inch crack was approximately 7 inches from the propeller tip. The crack started from a nick in the propeller leading edge.

The first regular U.S. air mail service was inaugurated between Washington, D.C. and New York City in 1918.

James H. Doolittle made the first successful instrument landing on September 24, 1929.

BE AWARE

AIRFRAME AND POWERPLANT LICENSE: CORRECT ADDRESS MANDATORY

It has been noted recently that there are many U.S. Certificated Aviation mechanics with airframe and power plant ratings holding certificates with incorrect addresses. The certificate holder must remember that the U.S. Federal Aviation Administration (FAA) records are centralized in its record system at the Mike Monroney Aeronautical Center located at Oklahoma City and not maintained at individual district offices.

The FAA considers it mandatory that the certificate holders notify the Airmen Certification Branch of any change in their permanent address. Failure to do so could result in the denial of certificate privileges.

AC Form 8060-55, Change of Address Notification, may be obtained from any FAA district office. It is the responsibility of the certificate holder to obtain and initiate this form. The form should be mailed to the Airmen Certification Branch, AAC-260, Mike Monroney Aeronautical Center, P.O. Box 25082, Oklahoma City, OK 73125.

FLIGHT SAFETY FOUNDATION, INC.

NOTE: An address change for certificated agencies, air taxi operators, repair stations, etc., must be reported to the supervising FAA district office. The computer mailing list for the "Alerts" is maintained from the appropriate forms submitted by the FAA offices. To remove an address, in the event of going out of business, the appropriate FAA office must be informed in order to submit the proper form for removal. Several General Aviation Airworthiness Alerts are returned each month stamped: MOVED - NO FORWARDING ADDRESS, FORWARDING ORDER EXPIRED, or P.O. BOX CLOSED, etc. Your help in decreasing the number of returns will be appreciated. Other Alerts recipients, please include a copy of the mailing label when making a change of address request.

NOTE: This article was previously published in Alerts No. 72 dated July 1984.

BALLOON BLAST VALVE

During a burn, the blast valve stuck open allowing a continuous burn. The burner was shut down by closing the fuel valve at the tank. Inspection of the blast valve assembly revealed it contained three copper washers which were two more than shown in the valve manufacturer's specifications. There was no play in the valve handle with three washers installed, and the valve would stick in the open position. The valve would not stick in the open position after the two extra washers were removed. During the followup investigation, it was determined that it is common practice within the balloon community for the pilot/owner of balloons to perform their own maintenance on the valve assembly or to have the valve assembly repaired by a local propane dealer. The submitter recommended that all pilots/owners be made aware of the importance of having repairs and maintenance to the fuel burner and valve systems completed by authorized aircraft maintenance personnel only.

OVERHAUL MANUALS

All personnel associated with the overhaul of airframes, engines, propellers, appliances, component parts, etc., should be aware of the importance of assuring that the overhaul manuals are of the latest revision. At least one recent engine failure was attributed to using an overhaul manual which was not of the latest revision. The use of out-of-date manuals not only contributes to questionable overhauls, but is not in compliance with the requirements of FAR Part 43.

OF INTEREST

OVERHAULED AIR PUMPS

A submitter advised of installing several overhauled 441/442 series Airborne dry air pumps which failed immediately upon engine run or within 2 hours. No problems occurred when new units were installed. The following Airborne Service Letter No. 29 pertains to the problem:

Subject: Overhauled Dry Air Pumps and Parts Replacement Kits

Applicability: All Aircraft Using Dry Air Pumps

It has come to our attention that Airborne dry air pumps are being overhauled or "field reconditioned" with FAA approval. Airborne has not authorized anyone to overhaul 211/212/241/242/441/442/842 series pumps and has not sold spare parts to "field recondition" these dry air pumps.

Inspection of overhauled dry air pumps and parts replacement kits from a number of suppliers has revealed that, in all cases, the overhauled and "field reconditioned" units did not conform to original manufacturer specifications. Also, Airborne tests of overhauled dry air pumps and parts replacement kits showed pump output flow and life expectancy to be significantly inferior to that of new Airborne pumps.

All overhauled 441/442 series de-ice pumps tested either broke during standard Airborne engineering evaluation tests or could not provide full boot inflation at altitude within the normal 6 second de-ice cycle. Most of the overhauled 211/212 series gyro pumps tested exhibited lower than normal flow and high operating temperatures.

AIRCRAFT OWNERS/OPERATORS SHOULD BE AWARE OF THE INCREASED RISK OF PUMP FAILURE AND/OR INADEQUATE PUMP FLOW WHEN USING OVERHAULED OR "FIELD RECONDITIONED" PUMPS.

For de-ice system 441/442 series pumps, inadequate de-ice boot inflation at altitude is not easily detected by in-flight visual checks or during ground run-up and may not be discovered until the boots fail to properly remove ice from the wings or empennage.

For 211/212 series gyro pumps, lower than normal flow can result in the loss of gyro operation, particularly at altitude. Higher than normal operating temperature will significantly shorten pump life, and may also damage the gyros in pressure instrument systems.

The use of overhauled or field reconditioned dry air pumps is an invitation to poor system performance and short pump life. Therefore, Airborne continues to recommend that any time an air pump is replaced, only a new air pump should be installed.

MAINTENANCE NOTES

CHECK CLEARANCE

Both propeller anti-ice discharge tubes were damaged on a twin engine aircraft by safety wire pigtails. The pigtails were left too long after safetying the propeller studs during propeller reinstallation. The too long safety wire cut into the anti-ice tubes during propeller rotation. A check for adequate clearance after propeller installation was recommended.

Franklin Delano Roosevelt became the first President to fly while in office.

☆U.S. Government Printing Office: 1986—491-010/20006

U.S. Department
of Transportation

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SEPTEMBER 1986

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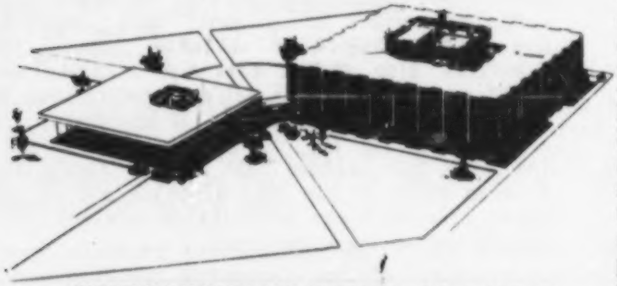
ADVISORY CIRCULAR
AC 43-16

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C. 20590

GENERAL AVIATION AIRWORTHINESS ALERTS

SEPTEMBER 1986

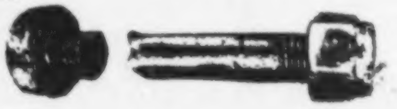


AVIATION STANDARDS NATIONAL FIELD OFFICE
MIKE MONRONEY AERONAUTICAL CENTER

The General Aviation Airworthiness Alerts provide a common communication channel through which the aviation community can economically interchange service experience and thereby cooperate in the improvement of aeronautical product durability, reliability, and safety. This publication is prepared from information submitted by those of you who operate and maintain civil aeronautical products. The contents include items that have been reported to be significant, but which have not been evaluated fully by the time the material went to press. As additional facts such as cause and corrective action are identified, the data will be published in subsequent issues of the Alerts. This procedure gives Alerts readers prompt notice of conditions reported via Malfunction or Defect Reports. Your comments and suggestions for improvement are always welcome. Send to: Aviation Standards National Field Office, Attn: AVN-110, P.O. Box 26460, Oklahoma City, Oklahoma 73125.

AIRCRAFT

AIR TRACTOR

Air Tractor Model AT-301	Sheared Bolt 	The forward attaching bolt was found sheared and seized into the tailwheel spring. Failure of this bolt could cause structural and possible rudder damage during operation. The submitter recommends frequent inspection for bolt condition. Aircraft time -- 1,356 hours.

ARCTIC AIRCRAFT

Arctic Aircraft Model S-1B2	Brake Master Cylinder	The left and right master cylinder piston rods broke at the base of the threaded portion. The cause was excessive force required to apply the brakes. The submitter advised that it appeared that the master cylinder would not develop sufficient pressure to hold the aircraft at any power setting above 1,000 r.p.m. Part total time -- 47 hours.

AMATEUR BUILT

Amateur Built Stolp Model SA-300	Aileron Problems	A recently processed Malfunction or Defect Report cited failure of the aileron control system on the Stolp Model SA-300 Starduster Too. This condition was found by accident. An individual leaned on the upper right aileron which caused it to travel to a vertical position with the entire aileron system locking over center. The same problem was duplicated by applying physical pressure to the upper left aileron surface. The submitter feels that maneuvers such as tailslides, hammerhead stalls, or heavy wind turbulence might bring about this condition due to the absence of suitable stops. The submitter also stated that the airplane was built according to the Stolp drawings and it may be assumed that most SA-300 Starduster Too airplanes would be found with this defect. The submitter advised that he was installing aileron stops on the control stick and on the upper aileron hinge brackets to prevent this locked-over-center condition.

BEECH

Beech Reciprocating Engine Models	"Starter Engaged" Annunciator Light Kits	To prevent complete electrical failure or starter/engine damage occurring as a result of constantly engaged starter motors, Beech Aircraft Corporation has made "Starter Engaged" Annunciator Light Kit installations available for the following reciprocating engine driven models:

Model	Kit
19, 23, 24, 77 Series	23-008
33, A33 (S/N CD-1 thru CD-387)	33-3006
33 Series (S/N CD-388 and after), 35 and 36 Series	35-3021
50, 65, 70, 80, 88 Series	55-3022

Beech has POH/AFM revisions available for airplanes not listed above which contain procedures for detecting failure of the starter to disengage following an engine start.

A superior pilot is one who stays out of trouble by using his superior judgment to avoid situations which might require the use of his superior skill.

Beech
Model C23

Leaking Valve

While performing an annual inspection, it was noted that the fuel selector valve was leaking through the selector handle shaft seal. The owner stated that he had been experiencing fuel odors in the cockpit for some time and that the fuel selector valve was replaced a year ago. A check of the stamped cure date revealed that the cure date had expired prior to purchase date. A new valve was ordered, and its cure date had also expired. All fuel selector valves in stock were pulled and seals replaced.

Beech
Models 33, 35, 36,
55, 58, and 95
Series Aircraft

Fuel System
Contamination

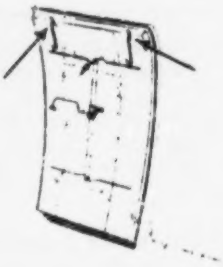
There have been reports of Beech Barons losing engine power due to deterioration of the fuel reservoir tank foam. The fuel reservoir is filled with the foam material to prevent the tank from collapsing. Even though most of the deteriorated foam material is trapped by the main fuel filter, accumulation of the material in the filter will eventually restrict the fuel flow resulting in a reduction of engine power.

Beech Aircraft Corporation has issued Mandatory Service Bulletin No. 2109, which deals with the inspection and replacement of the reservoir tank foam inserts on the listed airplane models. This service bulletin specifies the inspection must be accomplished every 50 hours of operation until the next scheduled inspection, at which time the foam insert in the fuel cell reservoir assembly must be replaced. The replacement inserts are fabricated from a new material which is not subject to hydrolytic action causing the deterioration of the original foam inserts.

It was recommended that all owners of the affected airplanes obtain and comply with Beechcraft Mandatory Service Bulletin No. 2109. This item updates the article on the same subject which appeared on page 1 of the October 1985 issue of the Alerts.

Beech
Model 200
Series

Cabin Entrance
Door Latching
Mechanism



Incorrect rigging of the door latching mechanism can lead to overload failure of one of the two hooks (see sketch) and complete loss of the door during flight. This has occurred on three occasions. These doors must be maintained in a properly rigged condition or such mishaps can occur. Section 52-10-00 of the Model 200 Maintenance Manual applies.

BRITISH AEROSPACE

British Aerospace
Model Jetstream
3101

Eros Quick Donning
Mask Regulator
P/N MC10-06-00 and
MC10-06-01

Eros issued Service Bulletin (SB) MC10-35-22 Revision 1 dated 6/28/85 describing a one-time inspection to detect loose swaged connectors in MXH15-1 pneumatic harnesses. One became detached from a mask during inflation.

British Aerospace issued SB 35-JA-851211 dated 3/24/86 referring to the Eros SB. Specific mask serial numbers are listed in both service bulletins.

CESSNA

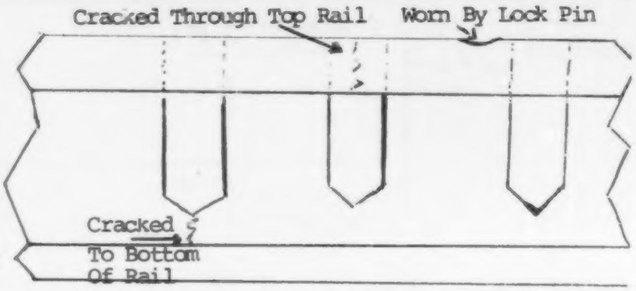
Cessna Model 150C	Elevator Bellcrank	During an annual inspection, the elevator travel was found to be 13 degrees up and 28 degrees down. The aircraft specifications and the maintenance manual show the travel to be 25 degrees up and 15 degrees down. Investigation revealed the elevator bellcrank had been previously installed upside down. When the bellcrank was installed correctly, the stops needed little adjustment to obtain proper travel. The submitter advised there are no warnings in the manuals or in the bellcrank area that the part can be installed incorrectly. Inability to obtain proper travel should be a hint, especially if the bellcrank has just been installed.
Cessna Model R172E	Carpet Dust	An ash-like substance was continually being found in the cabin and on the gyroscopic filter. The compound would turn into a powder form when touched. Investigation revealed the foam backing on the carpet had aged and was deteriorating, causing the fine dust. The carpet was replaced with new carpet without foam backing which solved the dust problem.
Cessna Model 172M	Leaking Fuel Selector Valve	The valve would not shut the fuel off during an annual inspection. Investigation disclosed the ball seat "O" rings had swollen and were protruding from their seats. This aircraft had been operating on automotive fuel for the past year.
Cessna Model 175A	Engine Attach Brackets	The engine attach brackets were found broken during an annual inspection. These brackets are located on each of the four corners aft of the firewall. Their function is to attach the engine mount to the fuselage, via bolts. The submitter has found brackets broken on 7 of 10 aircraft recently inspected. He believes an apparent cause is the additional weight and torque of the GO-300 engine as opposed to the lighter O-300 engine which uses the same brackets. The submitter recommends inspecting the brackets each 100 hours as total failure of the top two brackets could result in the engine separating from the airframe.
Cessna Model R182	Bellcrank Bolt Missing P/N NAS 464P3A3	One bolt and bushing were missing from the nosegear steering bellcrank on top of the nose strut. The opposite bolt in the bellcrank was found loose. The submitter recommended drilled head bolts to facilitate safetying. Aircraft time -- 1,310 hours.

Dwight D. Eisenhower was the first U.S. President to have held a pilot's license. License was issued November 30, 1939.

Cessna
Model 182P

Seat Rails Cracked

The seat rails for both pilot seats were found cracked through the rail portion. Aircraft time -- 1,826 hours.



Cessna
Model 185E

Bulkhead Corroded
P/N 0712217-1

The tailcone bulkhead assembly was found severely corroded. The aircraft had been on floats since new. The submitter advises that although access to the area is difficult, frequent inspections to check for corrosion are important. Aircraft time -- 2,693 hours.

Cessna
Model U206F

Fuel Strainer
Assembly

The fuel strainer standpipe was found corroded just above the "O" ring seating surface. Sediment in the bottom of the bowl and the aircraft being based in a coastal area may have contributed to the corrosion problem in the 2-month-old aircraft.

Cessna
Model TU206G

Check Valve
P/N S2361-1

The check valve is in the oil return line of the turbocharger. The valve is of the hinged door type, and the spring that closes the valve was broken. When the spring breaks, the valve can stay open and allow oil in the return line to drain back into the turbocharger after shutdown.

Cessna
Model 210 Series

Control Column
Binding

Just prior to lift-off, during the first flight after instrument maintenance, the elevator control jammed near the neutral position. Examination revealed the control wheel switch ribbon wire was wedged under the push/pull tube bearing assembly, thus restricting the movement of the control column.

Cessna Service Information Letter No. SE79-26 provides for the installation of a guard on the bearing assembly to prevent ribbon wire damage. A contributing factor may be that the congestion behind the instrument panel of the Model 210 allows less space for the ribbon wire to move during control displacements. This may lead to the binding on the control column.

The submitter recommends these guards be installed and that caution be used to maintain clearance of the ribbon wire whenever maintenance is performed behind the instrument panel. Cessna plans to either revise SE79-26 or release a new Service Information Letter expanding the serial applicability of airplanes eligible for these guards.

Cessna
Model 310

Leaking Oil Line

The pilot noticed oil on the ground under the right engine after a flight. Investigation revealed the oil pressure line from the engine to the firewall was leaking. The date on the oil hose assembly was December 1961.

Cessna
Model 310J

Tube Assembly
P/N 0840125-3

The nosegear would not extend, and the aircraft was landed with the nosegear in the retracted position. Investigation revealed the nosegear actuator intermediate tube was bent. The probable cause was due to wear in the linkages allowing the rigging to get out of adjustment and jam the actuator. Aircraft time -- 2,252 hours.

Cessna
Model 337

Bracket Broken
P/N 1513507-1

The aircraft owner reported that the ailerons were out of rig. Investigation revealed the pulley bracket below the pilot's feet was broken allowing decrease of cable tension. Cessna Multi-Engine Service Letter ME76-21, Revision 1, called for an inspection and possible replacement of the bracket with a new P/N 1513883-1 bracket. Service Letter 74-5 also mentions this problem, but neither service letter applies to this serial numbered aircraft.

Cessna
Models 300/400
Series (except 402C,
404, 414A, 421C and
441)

Main Gear Strut Inner
Bearing, P/N 5041108

During preflight inspection, it was noted that the left main strut appeared to be overinflated. Teardown of the strut disclosed that the inner bearing was broken into seven pieces. Breaks occurred vertically to the oil holes. The right gear bearing was found cracked through at one oil hole.

One recent report stated the failed bearing allowed full extension of the strut, jamming the gear in the wheel well.

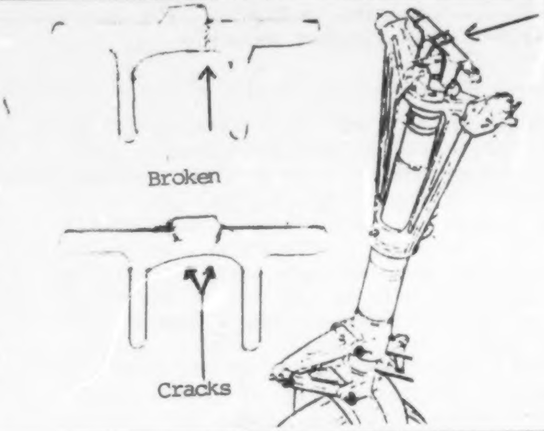
NOTE: This article was published in Alerts No. 28 dated November 1980. There was a recent report of an excessively worn bearing in the right strut on a Cessna 414 with 3,708 operating hours. The submitter suggested inspecting the strut assemblies of this type with over 1,500 hours time-in-service.

ADVISORY CIRCULAR 43-9B DISCUSSES MAINTENANCE RECORD REQUIREMENTS UNDER FAR'S 43.9, 43.11, AND 91.173 AND THE RELATED RESPONSIBILITIES OF OWNERS, OPERATORS, AND PERSONS PERFORMING MAINTENANCE, PREVENTIVE MAINTENANCE, AND ALTERATIONS.

Cessna
Models 421B
and 421C

Nose Steering Bellcrank

Maintenance personnel noticed the rudder did not move when the nosewheel was turned while moving the aircraft. Investigation revealed the bellcrank on top of the nosegear strut was broken and hanging loose. Time on the Cessna 421B was 3,650 hours. Inspection of a Cessna 421C with 2,186 hours revealed the bellcrank was cracked. The submitter advised that fatigue, and possibly exceeding the turning radius while towing, contributed to the problem. An inspection of the area at regular intervals was suggested.



Cessna
Model 421C

Alternator Brush Block
P/N 642424

The pilot reported the marker beacon reception was poor because of noise blocking the signal. The noise level would decrease with a heavy electrical load, or if one alternator was turned off. Noise filter capacitors were installed on both alternators, but the noise problem remained. Investigation of the right alternator revealed the brushes were one-third the original length and unevenly worn after 496 operating hours. The brush block was replaced with a superseded block, P/N 646853. The brushes in the left alternator were found in a similar condition as the right. Replacing the brush block in both alternators solved the noise problem.

Cessna
Model 421C

Alternator Brush
and Holder Assembly

The left alternator dropped off the line while both alternators were operating. When the right alternator was turned off, the left alternator would operate normally and assume all the load. Disassembly of the left alternator revealed one brush was gone, and the spring was chewing up the slip rings. This exact problem occurred in the first new alternator at 280 hours. The brushes lasted 332 hours in this alternator. The submitter advises the first brush inspection is due at 600 hours per the Service Manual.

FAIRCHILD

Fairchild
Model SA226-TC

Clogged Steering
Filter P/N 350506

The pilot applied left rudder during the landing roll, and the nosewheel steering did not respond. The system was disarmed, and the landing was completed without incident. The nosewheel steering manifold was replaced. Overhaul of the steering manifold disclosed the left actuator steering filter was clogged. The submitter recommends that the filters be removed from the actuator and cleaned at least every 1,000 hours.

Fairchild Model SA226-TC	Engine Mount Support Assembly	The left lower engine mount truss was found cracked through during routine maintenance. The engine mount truss had been inspected in accordance with Service Bulletin 71-009 within the preceeding 40 flight-hours. The engine mount support assembly was replaced.
Fairchild Model SA227-TT	Water in Static Line	During cruise flight in light rain, the right fuel limiter cut in, limiting the fuel flow. The engine indicators were observed as abnormal, the engine was shut down, and the propeller feathered. Investigation disclosed excessive water in the static line of the pressure transducer which caused erroneous signals resulting in limited fuel flow. Replacing the pressure transducer and purging the static line returned all systems to normal operation.

GATES LEARJET

Gates Learjet Model 23	Brake System	The normal brake system failed to actuate the brakes during a landing. Investigation revealed the emergency brake handle can be inadvertently actuated and, when actuated, introduces air into the brake system. When the brakes are operated normally after such an occurrence, the brake fuses close causing lack of braking force.
Gates Learjet Model 55	Chafed Fuel Line	A leak was observed during transfer of fuel from the wings to the fuselage tank. Investigation revealed the leak was created from a fuel line chafing a hydraulic line in the aft pressure bulkhead area. Both lines required replacement. Aircraft time -- 1,450 hours.

GULFSTREAM

Gulfstream Model 690A	Trim Cable	The pilot reported loss of manual pitch trim during descent for landing. Investigation revealed the pitch trim cable was frayed and broken approximately 1 inch forward of the pitch trim servo pulley. The pulley was found frozen, and the cable had been sliding in the pulley.
Gulfstream Models G-1159 and G-1159A	External Power Plug Shield	It was reported that the external power plug can be incorrectly connected. There is no shield on the aircraft external receptacle or provision to prevent incorrect power. The submitter recommends installation of a shield or some provision to prevent incorrect electrical power being applied to the system.

MITSUBISHI

Mitsubishi Model MU-2B-35	Corroded Tube P/N 030A-38421-31	During extension of the landing gear, the pilot reported hearing a loud "pop" in the landing gear area. The gear stopped extending, and a red "unsafe" light was illuminated. Application of emergency gear extension procedures extended the gear properly. Inspection revealed the gear door motor had burned up, and the gear door shear tube assembly was corroded internally. The popping noise was the shear pin, P/N 035A-38863, in the tube assembly breaking, as it should in this situation. When this occurs, the normal procedure would have been for the tube assembly to slide freely allowing the forward gear doors to open completely and the gear to extend and lock in the down position. The internal rust in the shear pin tube assembly prevented normal gear extension and required use of the emergency system. The submitter suggests the tube assembly be checked for internal corrosion on a 500-hour interval. Aircraft time -- 6,025 hours.

MOONEY

Mooney Model M20J	Leaking Fuel Hose

The Service Difficulty Data Bank contains eight Service Difficulty Reports (SDR's) on leaking fuel pressure transducer hose, Part Number (PN) S94B90145, on the Mooney M20J. These reports were processed between June 29, 1981, through February 29, 1986. Information contained in the SDR's indicates that leaking of the fuel pressure hose between the engine fuel injector and the fuel pressure transducer promoted each of the eight reports. The SDR information also indicates that hose failure is related to heat deterioration from the exhaust system. Three (37 percent) of the related SDR's indicate that detection of the fuel hose leak was incidental to pressure checking some other component of the fuel system. The reported total time-in-service at failure ranged from 590 to 1,109 hours, with an average of 850 hours.

Review of the Mooney M20J service information available revealed an applicable Service Instruction (SI) No. M20-59 issued November 10, 1983. Application of the SI is limited to Mooney M20J Serial Nos. 24-0378 through 24-12377. The SI recommends replacement of brittle or deteriorated hose, PN S94B90145, with new fire resistant hose assembly, P/N 600375-25, followed by a leak check with the system pressurized by the auxiliary pump. Pressure checking the original hose for leaks is not mentioned, although the Mooney Service Manual specifies a pressurized leak check of the fuel system during each annual or 100-hour inspection of the airplane.

NOTE: Related articles were published in Alerts No. 78 dated January 1985 and Alerts No. 93 dated April 1986.

Mooney Model M20J	Muffler P/N 630045-503	It was reported that the muffler flame tubes were found broken with parts missing on half of the aircraft inspected. This reported aircraft, having burned and broken flame tubes, was 2 years old. Aircraft time was not given.

PIPER

Piper
Model PA-23-250

Rudder Hinges
P/N's 16102-2 and
16102-3

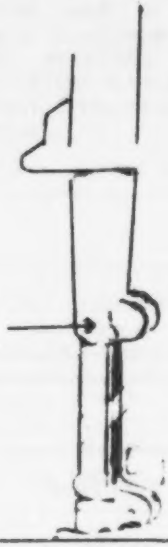
The top and center rudder hinges were found cracked at the aft part in the bearing area. The submitter suggests removal of the rudder for hinge inspection each 500 hours. Aircraft time -- 4,059 hours.

Piper
Model PA-28-140

Landing Gear
Cylinder Housing

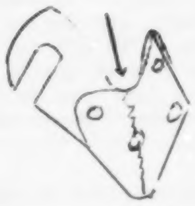
The left gear outboard attach lug ear for the upper portion of the torque link was found cracked during a 100-hour inspection. Aircraft time -- 4,110 hours.

NOTE: A related article was published in Alerts No. 84 dated July 1985.



Piper
Model PA-28R-201

Downlock Assembly



The nosegear extended during cruise flight. When the gear switch was selected to the down position, the mains indicated safe, but the nosegear indicated unsafe and the warning horn sounded. A normal landing was accomplished. Investigators disclosed the nosegear downlock casting was broken at the point the attach bolt joins the upper drag link. Aircraft time -- 2,886 hours.

Piper
Model PA-31

Rod Assembly
P/N 41949-02

The right landing gear collapsed during taxi. Investigation disclosed the telescoping rod end of the assembly was frozen in the retracted position preventing the downlock hook from engaging. The cause for the stuck or frozen rod end was lack of lubrication.

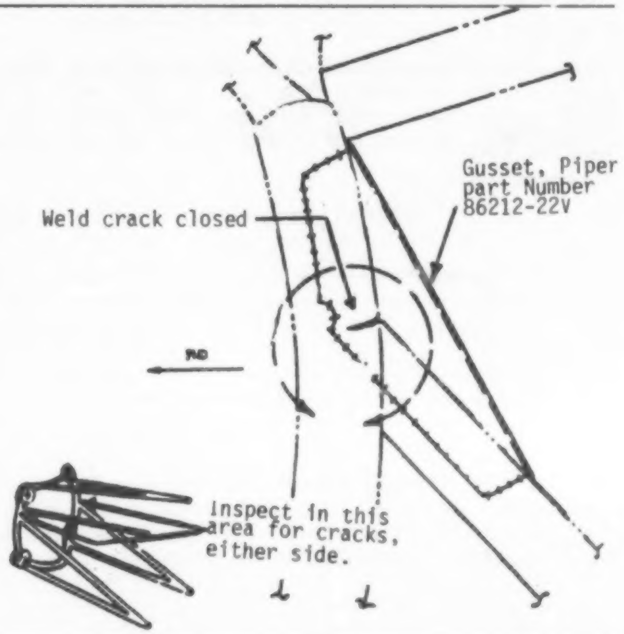
Piper
Model PA-32-260

Engine Cowl
Plate Assembly

The cowl pin plate assembly pin holes were found nearly worn through. Inspection of the area was prompted by a related article in Alerts No. 89 dated December 1985.

Piper Model PA-32R-300	Engine Mount Cracked	While making a lower cowling repair, the mechanic noticed a crack in the engine mount at the lower, rear, inboard, right side weld cluster. The crack extended approximately 270 degrees around the rear support tube. The crack was in a location as described in Piper Service Letter No. 799. The mount was replaced with a unit containing the reinforcement gussets. The submitter recommends continual 100-hour inspection of the area and installation of mounts with reinforcement gussets as soon as practical, or at engine overhaul, on affected aircraft.
Piper Model PA-34-200	Downlock Bolt P/N 400 890	The nose landing gear folded during landing. Investigation revealed the nosegear downlock link assembly bolt had sheared. The submitter recommends checking the bolt for condition during each inspection.
Piper Model PA-34-200T	Trim Problems	During cruise with the autopilot on, the pilot encountered a mountain wave resulting in full nose-up trim. The pilot was unable to disconnect the autopilot by normal means. The engines were retarded, but this didn't help the situation. About to stall, the pilot turned off all electrical power and manually broke the trim loose. Investigation revealed that the nose trim was stuck in the full up position against the stops. Dirt was found on the jackscrew causing binding. The submitter suggested checking the trim jackscrew for cleanliness to prevent binding. The submitter also advised they were unable to determine why the autopilot or electric trim would not disconnect by normal means.
Piper Model PA-44-180	Engine Mount Cracked	

While complying with Piper Service Bulletin No. 719, the left engine mount was found cracked through at the outboard point of inspection. The submitter advised this aircraft had gone through nine 100-hour inspections with no mention of complying with Service Bulletin No. 719. He suggests an airworthiness directive making it mandatory to install the P/N 86212-22 reinforcement as shown in the service bulletin.


Weld crack closed
Gusset, Piper part Number 86212-22V
Inspect in this area for cracks, either side.

SCHWEIZER

Schweizer
Model G-164A

Corroded Tube

The small steel tube welded between the rudder spar and the rudder trailing edge was found corroded and rusted through. Moisture had entered the rudder through the navigation light mounting area. The submitter suggests using a sealant around the navigation light mounting assembly.

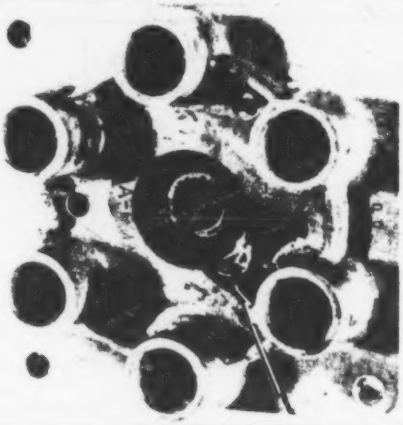
ACCESSORIES

BENDIX

Bendix
Magneto
Model S6RN-1209

Distributor Block
P/N 10-391319

Secondary high voltage discharged out of the distributor gear shaft and arced to the tower side of the distributor block. Engine operation was normal on the ground and until passing through 6,000 feet when the engine became rough and remained running rough until engine shutdown. Part total time -- 1 hour.



FACET

Facet
Carburetor
Model MA3-PA
(Correction)

Wrong Part
P/N 47-833

The carburetor was overhauled twice trying to find why the Lycoming O-235-L2C engine in a Cessna 152 ran excessively rich. Lycoming stated that Change Order No. 22215 from Cessna to Lycoming, stated that nozzle assembly P/N 47-833 is to be replaced with 47-846. The submitter advised this information is not in the field.

NOTE: Since the above article was published in Alerts No. 93 dated April 1986, Lycoming has advised that Change Order No. 22215 was issued to replace the composite float with a metal float and has nothing to do with an over-rich condition. Lycoming Service Instruction (SI) No. 1393 was issued November 16, 1979. The SI was issued to eliminate stumbling in flight or hesitation encountered during rapid throttle acceleration on certain O-235-L2C engines installed in Cessna Model 152 aircraft.

SLICK

Slick Magneto Model 6210	Distributor Block and Gear Assembly	The distributor finger became loose. This allowed the finger to contact and cut into the distributor block assembly contact posts. There were brass filings throughout the magneto. This condition was found during a 500-hour inspection. There had been no reported magneto problem during magneto checks or aircraft operation.

ENGINES

CONTINENTAL

Continental Model TSIO-520-AE	Throttle Lever P/N 643097	The engine idle speed on a Cessna 303 was sometimes low, sometimes normal, and at times too high. Investigation disclosed the throttle block lever on the throttle shaft was loose. One roll pin secures this lever to the shaft, and the roll pin hole was severely elongated allowing varying engine idle speeds. The lever is aluminum and holds the idle and full throttle stopscrew.

BE AWARE

HARDWARE MISAPPLICATION

A repair patch on the right flap of a Cessna 180 was found installed with hardware store type "pop" rivets. The submitter advised that the use of this type rivet in structural areas or for replacing approved rivets appeared to be increasing. He further advised that some rivets were being installed by Airframe and Powerplant (A & P) mechanics and A & P's with Inspection Authorization are approving their installation.

NOTE: Alerts No. 96 dated July 1986 contains an article referencing improper use of machine screws.

MAINTENANCE NOTE

FLEXIBLE VENTILATION DUCTS

Inspection of ventilation ducts on older aircraft revealed a possible health hazard. The interior of the ducts was deteriorating into fine particles which were circulated into the cabin area. Some of the ducts contain fiberglass which could cause problems if particles are allowed to float through the cockpit and cabin area. Inspection and replacement of deteriorating ducts on older aircraft was recommended.

☆ U.S. Government Printing Office: 1986—491-810/20532

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ALERT NO. 99
OCTOBER 1986

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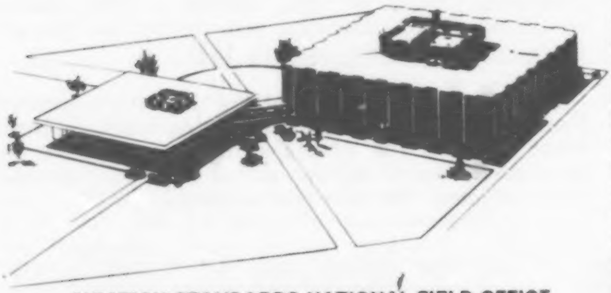
ADVISORY CIRCULAR
AC 43-16

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C. 20590

GENERAL AVIATION AIRWORTHINESS ALERTS

OCTOBER 1986



AVIATION STANDARDS NATIONAL FIELD OFFICE
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The General Aviation Airworthiness Alerts provide a common communication channel through which the aviation community can economically interchange service experience and thereby cooperate in the improvement of aeronautical product durability, reliability, and safety. This publication is prepared from information submitted by those of you who operate and maintain civil aeronautical products. The contents include items that have been reported to be significant, but which have not been evaluated fully by the time the material went to press. As additional facts such as cause and corrective action are identified, the data will be published in subsequent issues of the Alerts. This procedure gives Alerts readers prompt notice of conditions reported via Malfunction or Defect Reports. Your comments and suggestions for improvement are always welcome. Send to: Aviation Standards National Field Office, Attn: AVN-110, P.O. Box 26460, Oklahoma City, Oklahoma 73125.

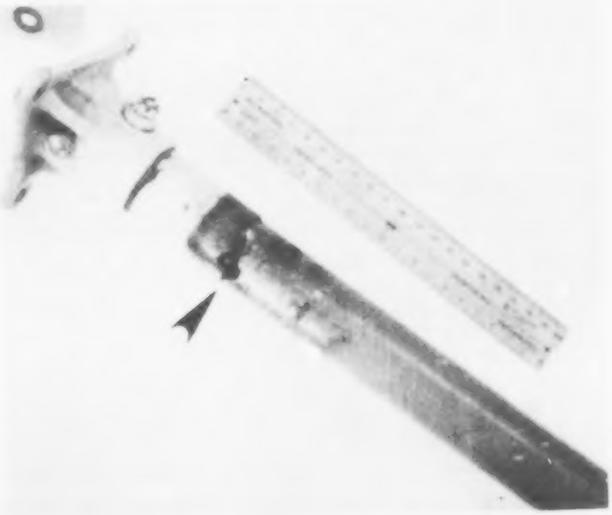
AIRCRAFT

BEECH

Beech
Models 99 and
100 Series

Elevator Torque Tubes
P/N 115-610010-191

An elevator torque tube was found cracked almost completely around its circumference at the inboard support. Beech Service Bulletin No. 2145 calls for removal and inspection of all elevator torque tubes having more than 5,000 hours time-in-service. If cracked tubes are found, a report should be submitted to the nearest FAA Flight Standards District Office.



Beech Model C90A, Serial LJ-1063 & after; Model F90, Serial LA-226 & after; Model B200, Serial BB-1158, -1167, -1193 & after; Model B200C, Serial BL-73 & after; Model 300 Series, Model 99 Series, Model 1900 Series	Hydraulic Landing Gear - Servicing	A Beechcraft Communique states that two cases have occurred where a main gear was folded when a mechanic was adding nitrogen to the accumulator in the landing gear hydraulic system. The airplane drops abruptly and could injure personnel if anyone were under the wing or nacelle at the time. Damage to the airplane does occur. In both cases, only one gear folded, but it would be possible for all gears to fold. Internal leakage around the piston or air leakage to outside can allow the accumulator to become hydraulically locked; in other words, displaces oil with air. Thus, if nitrogen pressure is added, it can directly pressurize the up (retract) lines of the system. This causes unlocking of the downlock and starts the retract cycle enough for the gear to fold. The Communique advises that maintenance personnel should never service the accumulator without first placing the airplane on jacks. Never do maintenance or rigging of the system without first placing the airplane on jacks.

BELL

Bell Model 206B III	Chafed Wire Bundle	During flight, the searchlight circuit breaker popped, the low r.p.m. audio came on and would not turn off, and the turbine outlet temperature indicator stuck at 660°C on engine shutdown. Investigation revealed the wire bundle running fore and aft under the center console was chafed. Further investigation disclosed the problem was caused by the two top cherry rivets used to attach the aircraft data plate to the center console. The rivets had chafed through the bundle causing a direct short. The submitter recommends a one-time inspection and installation of a clamp and standoff to prevent the wire bundle from contacting the rivet tail.

CESSNA

Cessna Model 172M	Fuel Tank	Fuel stains were present on the bottom of the right wing and on the side of the fuselage. After various gasket replacements, a crack was found at the fuel tank filler neck where it is welded to the tank. The crack extended from the 7 o'clock to the 11 o'clock position as viewed from the rear of the tank. The crack could have been caused by the weight of the refueling nozzle resting on the filler neck during refueling. It was suggested that careful tank filling procedures be followed as a general precaution.

Cessna
Model 172N

Carburetor Heat
Butterfly Valve

The carburetor heat butterfly valve was found with one rivet head missing and the other rivets severely worn. The rivets were replaced with steel screws and nuts. The submitter advised that with the valve assembly full on or off, condition of the rivets is difficult to determine because of the tight fit. The valve must be half on or off, the control arm held, and the valve assembly wiggled to detect rivet condition.

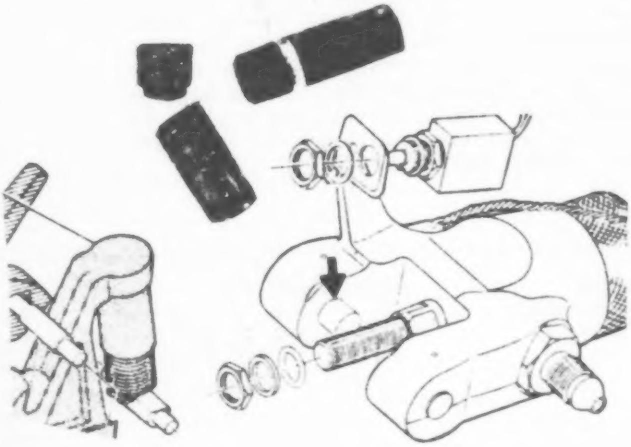
Cessna
Model 172N

Fuel Line
Assembly

The line from the fuel selector to the strainer was worn almost through its wall thickness by the right steering tube. It is recommended that a one-time inspection of the fuel line be performed and procedures taken to secure the line clear of the steering tube or other components.

Cessna
Model 172RG

Broken Downlock
Pin P/N 1280209-1

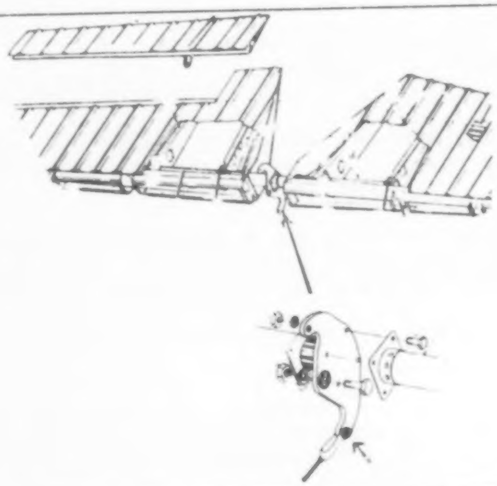


The downlock pin broke inside the bearing end. This allowed the downlock pin to drift out and contact the nut preventing the nosegear from fully extending and locking down. The gear unsafe horn was operational and did warn of the condition. The nosegear collapsed during rollout after landing. The submitter suggests inspection for proper clearance between the pin and nut during each annual inspection. Aircraft time - 1,300 hours.

NOTE: A related article was published on a Cessna R182 in Alerts No. 75 dated October 1984.

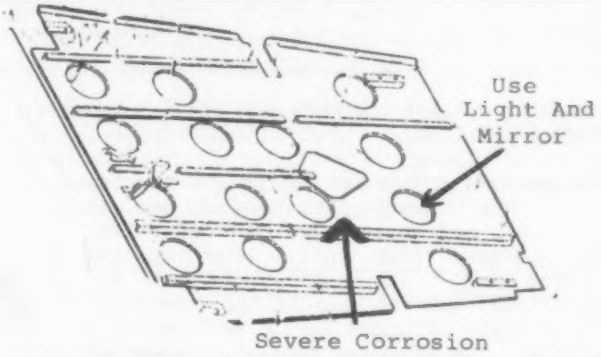
Cessna
Model R172K

Elevator Bellcrank
P/N 0534122-1



Severe intergranular corrosion was found at the bellcrank lower cable attach point. The submitter estimated the structural integrity of the bellcrank was reduced by 40 percent. The bellcrank was replaced. The submitter suggests inspecting the bellcrank for condition and presence of corrosion protection. Time on the 1979 model aircraft - 1,364 hours.

ADVISORY CIRCULAR 43-9B DISCUSSES MAINTENANCE RECORD REQUIREMENTS UNDER FAR'S 43.9, 43.11, AND 91.173 AND THE RELATED RESPONSIBILITIES OF OWNERS, OPERATORS, AND PRSONS PERFORMING MAINTENANCE, PREVENTIVE MAINTENANCE, AND ALTERATIONS.

Cessna Models 172 and R182	Pilot's Seat Roll Pin	The seat backrest collapsed during takeoff causing momentary loss of aircraft control. The submitter advised that four of the roll pins were found broken or missing. These roll pins keep the backrest portion of the seat upright. Pin breakage during takeoff could cause many problems as the pilot falls backwards. NOTE: The above article was published in Alerts No. 81 dated April 1985. There was a recent report of finding the roll pins missing or partially out of the seats in three separate Cessna 172 aircraft. This submitter used safety wire through the pins and around the torque tube to keep the pins installed.
Cessna Model 180H	Baggage Compartment Floor Corroded	Severe corrosion was found between the skin layers under the aft seat center mount reinforcement plate. This condition was found by using a flashlight and mirror through an inspection panel in the baggage compartment floor. A steel angle plate in the same area was badly rusted. Aircraft time - 5,444 hours. 
Cessna Model 182Q	Engine Mount	The right upper engine mount leg separated 10 inches forward of the firewall mount at the fishmouth weld. The mount failed in flight. The pilot noticed the aircraft yawed to the left. The probable cause originated with a possible flaw in manufacturing. A crack developed resulting in final failure. Rust inside the mount and on the break indicated the crack was undetected for an indefinite period of time.
Cessna Models R182 and TR182	Propeller Control System	The pilot reported low propeller r.p.m. during takeoff. Investigation disclosed the intercylinder baffling had broken causing the propeller cable to move the propeller into high pitch which caused the low r.p.m. This submitter advised that to prevent baffle breakage, low r.p.m., and engine overboost, a brace should be installed from the engine to the propeller control cable installation at the baffle assembly near the No. 2 cylinder. Another submitter recommends that an airworthiness directive be issued making compliance with Cessna Service Letter SE82-15A mandatory.
Cessna Model TU206	Engine Mount Support Channel, P/N 1213433-6	The turbocharger pressure hose (with the wire braid exterior) was found to have worn a hole in the engine mount support channel. It was recommended that this hose be carefully examined and secured away from the channel. The submitter recommends micarta scuff strip as protection.

Cessna
Model T303

Vertical Fin
Bolts P/N AN5-6A

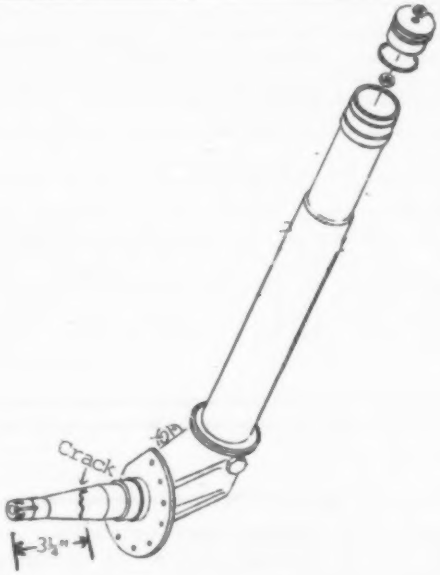
Seven out of eight mounting bolts were found loose. Proper torque was applied and all bolts torque sealed. The submitter suspects flight vibration may be causing the bolts to loosen and recommends checking the bolts each 100 hours. Aircraft time - 249 hours.

NOTE: Since this article was published in Alerts No. 93 dated April 1986, there have been additional reports of finding loose bolts. One submitter suggested an airworthiness directive mandating a one-time inspection for proper bolt torque.

Cessna
Model 402A

Cracked Axle
P/N 5041000-76

The right brake assembly chafed the strut piston. Removal of the wheel assembly revealed a 3.5-inch circumferential crack in the axle. Research of the aircraft log books disclosed no recorded hard landings. The aircraft time was listed as 18,661 hours.



Cessna
Models 402C, 404,
414A, 421C, 425,
and 441

Hydraulic Landing
Gear Actuators

The following is reprinted from Cessna Service Newsletter No. SNL85-23:

It has been discovered that improper lubricants such as lithium base greases have been used during field maintenance, repair and overhaul of Western Hydraulics and Cessna Fluid Power hydraulic landing gear actuators.

The use of improper lubricants may cause contamination and subsequent corrosion of the actuator downlock mechanisms and downlock indicating microswitch. A contaminated or corroded downlock mechanism or microswitch could possibly result in providing false landing gear position indications.

Currently, the only lubricant approved in these actuator Overhaul Manuals is hydraulic fluid conforming to MIL-H-5606 or MIL-H-6083.

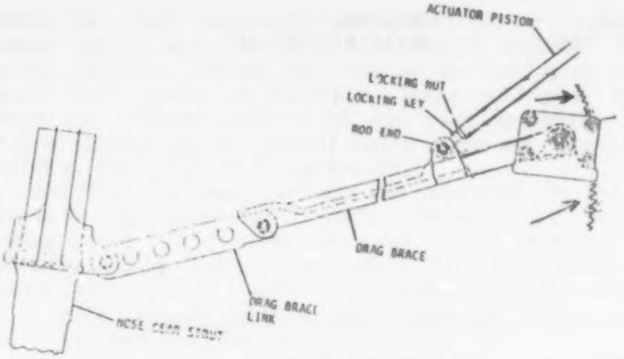
For Western Hydraulics or Cessna Fluid Power landing gear actuators that have been reassembled with improper lubricants during field maintenance repair or overhaul; it is recommended to inspect these actuators for the conditions described above and reassemble them with the approved lubricants.

It is most important to remember that any rigging, readjustment, repair or overhaul of these actuators must be accomplished per the instructions and procedures in their respective Overhaul Manuals. The Overhaul Manuals may be obtained by referring to the current Customer Care Supplies and Publications Catalog for these nose and main landing gear hydraulic actuators.

Cessna
Model 414

Cracked Skin

Cracks were found in the nosewheel well skin at the attach point of the left drag brace. The cracks were repaired by installing a reinforcing plate. Cause or contributing factors were not given. Aircraft time - 600 hours.



CHRISTEN INDUSTRIES, INC.

Christen
Pitts
Model S-2B

Exhaust System

The exhaust system on all S-2B models bolt up close to the engine mount tubing on the left side. The mount becomes hot, and the paint burns away leading to oxidation and corrosion in the area. The starter cable is tie wrapped to the mount, and the cable insulation is damaged from the heat. The submitter recommends installing a heat shield on the mount and rerouting the starter cable.

FAIRCHILD

Fairchild
Models SA26
and SA226

Landing Gear Control Unit

Operators are urged to inspect the landing gear selector unit, mounted on the left side of the cockpit pedestal, to assure that the detents adequately protect against accidental movement of the handle to the up position. Because the detents are subject to wear, special attention should be given to older airplanes. If the detents are worn, the detents should be replaced immediately.

There have been several cases of premature or unwanted landing gear retraction on SA26 and SA226 airplanes. The possible cause of these occurrences was worn landing gear control unit detents, which allowed the control handle to be moved to the up position accidentally. Landing gear squat switches normally protect against retraction when the airplane is on the ground; however, with the handle in the up position, a bounce on takeoff could result in the gear retracting before the airplane is ready to fly. Also, pilots have contended that some of the unwanted retractions happened when the control was accidently moved just before landing touchdown. Propeller blades suffered irreparable damage during some of these occurrences.

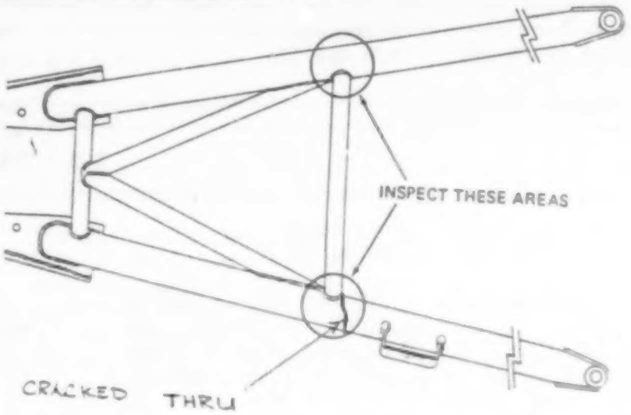
Fairchild Service Bulletin 226-32-048, issued March 20, 1984, offered an improved control handle bracket to SA226 operators. This bracket has deepened detents and is made of steel for improved wear characteristics. The same bracket, P/N 27K21003-003, fits SA26 series airplanes and is recommended for use as a replacement part.
NOTE: Article excerpted from Fairchild Company publication "FACTS" dated June 1986.

Fairchild
Model SA226-TC

Engine Mount
Support Assembly

The left lower engine mount truss was found cracked through during routine maintenance. The engine mount truss had been inspected in accordance with Service Bulletin 71-009 within the preceeding 40 flight-hours. The engine mount support assembly was replaced.

NOTE: This article was published in Alerts No. 98 dated September 1986 without the picture.



MOONEY

Mooney
Model M20J

Emergency Gear
Extension Lever

The landing gear would not retract due to accidental engagement of the emergency retraction lever between the two front seats. If someone accidentally steps between or something is placed between the seats, the weight will unlock the motor. The submitter advised this is a common occurrence.

PIPER

Piper
Model PA-23-250

Carburetor Heat
Cables

Both carburetor heat cables were found worn to the point of failure inside the cable housings. This condition was found during removal of the carburetors. The cable must be advanced to full travel to observe the area of wear.

Piper
Model PA-25-235

Frayed Aileron
Cables

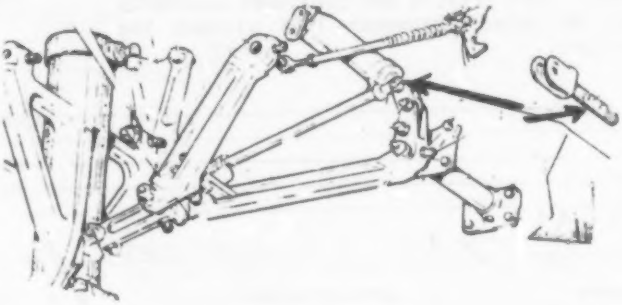
The left and right aileron cables were found frayed where they pass through the fairleads at wing station 23. Both cables had frayed to a point of only two strands remaining. Aircraft time - 5,025 hours.

Piper
Model PA-28-180

Oil Pressure
Hose P/N 71061

There was a loss of engine oil pressure during cruise, and the aircraft made an emergency landing. Investigation revealed the oil pressure hose had ruptured causing engine bearing failure. The manufacture date of the failed hose was May 1964. During engine removal, all hoses were found to be the originally installed hoses. The fuel primer hose broke in half during removal. All the hoses were extremely hard and brittle.

Major Charles E. Yeager, USAF, became the first pilot
to exceed the speed of sound in level flight on October 14, 1947.

Piper Model PA-28-236	Alternator Bolt P/N 486 126	The alternator attachment bolt breaks resulting in a loose alternator and broken attaching brackets. The submitter advised this bolt has been found broken on several aircraft equipped with air-conditioning. Reported time on this bolt - 38 hours.
Piper Model PA-31-350	Fork Bolt P/N 41789-00	The right maingear would not retract during flight. Investigation disclosed the maingear lock rod attachment fork bolt was sheared. The left fork bolt was removed and found excessively worn and ready to shear. The submitter suggests inspecting the bolt for wear and distortion each 100 hours and lubricating the downlock mechanism to prevent freezing and excessive loads on the fork bolt. NOTE: The above article was published in Alerts No. 81 dated April 1985. There was a recent report of the fork bolt breaking on a PA-31T. This submitter recommends bolt replacement at 2,000-hour intervals. 
Piper Model PA-32-301	Muffler P/N 67517-00	The muffler was found distorted and bent at the center of the muffler length. This condition was not apparent until the muffler shroud was removed. The submitter suggests removal of the shroud each 100 hours for a thorough inspection.
Piper Model PA-38-112	Engine Cowling Hinge Pin	The left hinge pin in the engine cowling moved forward and contacted the propeller. The propeller required replacing. The submitter advised there is no provision made to prevent the hinge pin from moving out of position. A longer pin to facilitate a bead on each end or a pin with a hole drilled in each end for installation of cotter pins was suggested.
Piper Model PA-42-720	Maingear Link Assembly P/N 57448-02	The flight crew heard a loud noise when the gear was retracted. The left maingear did not retract and collapsed upon landing. Investigation disclosed the maingear side brace link assembly had broken at the pivot point near the actuator attach point. Aircraft time - 860 hours.
Piper Model PA-44-180	Engine Mount Bolt	One engine mount bolt was found broken, and another was loose. All bolts were replaced, and one of the new bolts broke before specified torque was reached. Aircraft time - 684 hours.

SAFETY IS NEVER SIGNING OFF ANYTHING YOU HAVEN'T REALLY LOOKED AT -
AND WOULDN'T FLY IN YOURSELF

EQUIPMENT

EMERGENCY LOCATOR TRANSMITTER

Alert Model 50	Inspect and Check	The ELT switch was found in the "OFF" position. When a new battery was installed, the ELT switch was not placed in the "ARM" position. The submitter advised the ELT was probably not tested as the negative wire was found broken at the battery pack. This unit would not have operated if involved in a crash or needed in an emergency situation.

ACCESSORIES

BENDIX

Bendix	Key-Actuated Rotary Ignition Switch

Some Bendix key-actuated rotary ignition switches will allow removal of the key when the switch is in other than the "off" position. This can create the false impression that the switch is off and that it is safe to move the propeller. It is recommended that ALL Bendix key-actuated rotary ignition switches be checked in accordance with Bendix Service Bulletin 615. Also, it is recommended that prior to moving the propeller by hand, the ignition switch be confirmed in the "off" position whether or not the key is in the switch.

NOTE: The above article was published in Alerts No. 65 dated December 1983. The following was recently received via a Malfunction or Defect Report.

During maintenance on an aircraft, the propeller was turned a few degrees. A loud pop was heard from the engine and the propeller kicked back slightly. Company procedure is for aircraft keys to be placed on the aircraft instrument panel as a visual check that the switch is off, and this had been checked prior to moving the propeller. Upon further investigation, it was found that the key could be removed from the switch with it in any position. Other aircraft on the field were checked, and a similar condition was found on other 150's and on a Cessna 177 of the same vintage of production. The submitter feels that this condition is unsafe and would recommend all such switches be replaced with the newer type in which this condition does not exist. Bendix Service Bulletin No. 615 provides inspection procedures and replacement instructions for the ignition switch.

Bendix Model S6LN-204	Distributor Block Holddown Lobe	A crack was found across the lobe that holds the block assembly to the magneto. The crack extended almost through the main block area at the electrodes. This was the third consecutive cracked block found during annual inspections.
Bendix Model S6LN-1201	Internal Moisture	Both engines became very rough during an IFR flight in a Cessna 421C. The left engine quit on landing roll. Inspection revealed the right magneto on the left engine was inoperative from internal moisture. The left magneto on the left engine and the left magneto on the right were severely arcing internally. Three magnetos were replaced. Time on the magnetos - 170 hours.

FACET AEROSPACE PRODUCTS CO.

Facet Carburetor Model MA-3A	Float Assembly P/N 30766	The PA-38-112 aircraft engine lost power soon after takeoff requiring an immediate landing. All engine functions were normal during a ground run and check. Inspection of the carburetor revealed the floats were touching the bowl. The float would stick when contacting the bowl partially restricting fuel to the engine. This was the second identical problem the submitter had experienced within 1 week. The carburetor had been overhauled by different repair facilities. The submitter advised that when installing kit No. 666-915, carefully check the float assembly for proper soldering and alignment. Any suspicious kit should be rejected immediately prior to any clearance checks. If clearances are not easily obtained, reject the kit. He advised this appears to be a very common problem.

SLICK

Slick Magneto Model 4281R	Coil Cracked P/N M3114	The pilots had complained that the engine was hard to start. A series of troubleshooting techniques including timing checks, plug cleaning, primer nozzle cleaning, intake leak checks, and magneto switch replacement failed to solve the problem. Disassembly of the magneto revealed the coil was cracked around the circumference of the coil body. There were no coil cracks when checked 125 hours previously in accordance with Airworthiness Directive 81-16-05.

ENGINES

CONTINENTAL

Continental Model IO-360-KB	Oil Suction Screen	Foreign objects are being introduced into the oil supply. These objects are in turn being sucked up into the oil pickup tube and into the suction screen where they eventually work their way through the screen by either splitting the seam or simply breaking through the screen. The objects then enter the oil pump and jam it resulting in a loss of oil pressure and flow to the engine. This is the third instance the submitter has observed. In all three, the engines were destroyed by the oil starvation event. The submitter recommends that this screen be inspected at every oil change for foreign objects.

Continental — Oil Scavenge Pump
Model TSIO-360 — Bolts Safety Wire

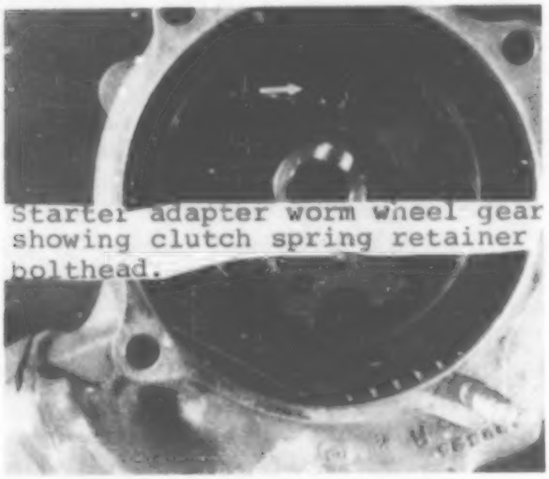
Loss of oil pressure and metal found in the oil filter on a TCM engine model TSIO360MB, S/N 317019, was attributed to a small piece of safety wire found in the accessory case. The source of the safety wire was the end pigtail from one of the four bolts used to secure the turbocharger oil scavenge pump cover.

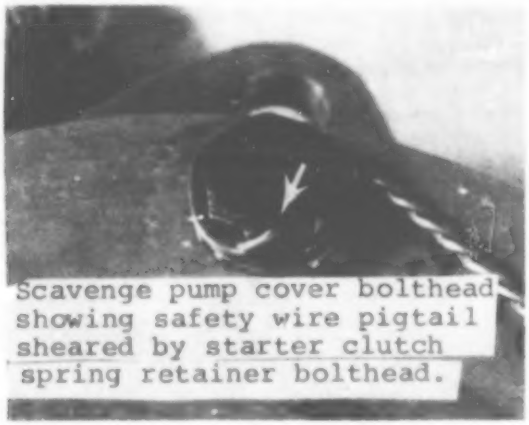
When the bolts were safety wired, the pigtail was on the inside diameter of the bolt circle and was not positioned to clear the head of the bolt installed in the starter worm wheel gear that secures the starter clutch spring.

As the starter was energized, the rotating bolthead in the worm wheel gear tore loose the pigtail from the scavenge pump cover bolt. The wire was then flushed down into the oil sump where it was picked up by the oil suction tube, passed through the oil pump scoring the pump housing, and lodged under the oil pressure relief valve causing the loss of oil pressure. The pressure relief valve seat showed a single impression to indicate the presence of material in this area.

This problem can occur on any TCM turbocharged engine in which the scavenge oil pump is part of the starter adapter assembly.

It is recommended that all mechanics be made aware of this problem and advised to exercise care when safety wiring to ensure adequate clearance between the safety wire and rotating components.

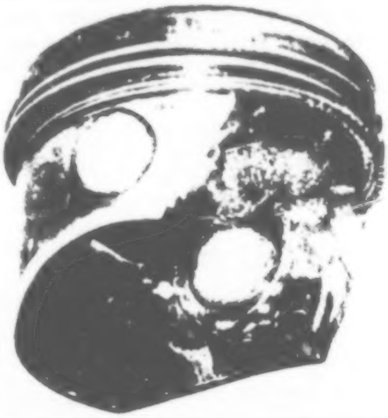

Starter adapter worm wheel gear showing clutch spring retainer bolthead.


Scavenge pump cover bolthead showing safety wire pigtail sheared by starter clutch spring retainer bolthead.

LYCOMING

Lycoming — Piston Broken
Model O-235-N2C — P/N LW-13623

A loud knock was heard from the engine while accelerating during a touch and go landing. A compression check revealed the No. 3 cylinder was 40/80 and wet with oil. Removal of the cylinder disclosed a large piece of the piston skirt missing. Part total time - 404 hours.



BE AWARE

BRAKE BREAK-IN

New Cleveland discs and metallic linings were installed on a Partanevia P68TC aircraft. The linings were conditioned by three hard braking stops from 45 to 50 m.p.h. in accordance with the information contained in the manual. After the third stop and a short taxi, the brakes failed. Pedal resistance and normal brake operation returned after the brake assemblies had cooled. Inspection revealed the brake linings were damaged. A Cleveland representative informed the submitter that the break-in procedures had been changed to two consecutive braking stops from 30 to 40 m.p.h. The submitter suggested this information be published to inform mechanics of the new procedures.

MESSAGE TO FAA HOT AIR BALLOON REPAIR STATIONS

The following was sent by the RegO Company, Manager of Product Integrity, by certified mail to FAA Hot Air Balloon Repair Stations on June 30, 1986.

Dear Sirs:

The RegO Company has become aware that a number of its products manufactured for use in ground based propane applications are being utilized in hot air balloons. These products include quick acting valves, cylinder valves, disconnect couplings and safety relief valves. It is our understanding that you, as an operator of a hot air balloon repair station, have been using RegO valves and equipment in repairing hot air balloons and balloon cylinders.

The RegO Company hereby makes demand upon you to cease utilizing RegO Company products in balloons you repair or maintain. This includes all RegO products utilized on propane cylinders, as well as all RegO products which might be used in the propane system on the balloons separate from the cylinders (such as quick acting valves).

The various valves manufactured by the RegO Company are not, and have never been, intended for use in hot air balloons. There are no RegO products that are tested or certified by the RegO Company for such use.

The RegO Company will not be responsible for the operation of its products in any type of application that is connected with hot air balloons. Any use by you of RegO products for such an application is a use of RegO products in a manner and for a purpose for which they are not manufactured. Such use will be your sole responsibility.

Be advised that at the same time the RegO Company is advising you of this position it is also notifying cylinder manufacturers, balloon manufacturers, and owners/operators of hot air balloons. Because of this, there should be no misunderstanding by any party involved that a use of a RegO product in a hot air balloon is a use that is contrary to the manufacturers recommendations.

In order to implement this program, the RegO Company will repurchase from you any and all RegO products that are in your possession that were purchased with the intent to utilize said products in hot air balloon applications. You may arrange for the return of such products, at our expense, and supply us with any reasonable proof of the purchase price you paid for said products, and said purchase price will be refunded to you.

Thank you for your immediate attention to this, and we look forward to your full cooperation in ensuring that RegO products are not used in the manner and for a purpose for which they are not intended.

REGO COMPANY
P.O. Box 247 Highway 100 at RegO Drive Elton College, NC 27244 (919) 449-7707

"Tell me, I'll forget. Show me, I may remember.
But involve me, and I'll understand."
...Chinese proverb.

OF INTEREST

STALL/SPIN ACCIDENTS CAUSED BY

INADEQUATE FLYING SPEEDS

There were 1,578 stall/spin accidents in the United States from 1980 through 1984. Of 1,578 stall/spin accidents, 1,360 were caused by failure to maintain adequate flying speed. The remaining 218 accidents had other cause factors assigned that were considered more appropriate for the particular accident. Cause factors in those categories were engine malfunctions, alcohol related, weather related, low aerobatics, improper operation of flight controls, poor preflight planning of aircraft performance, and early lift-off.

Failure to maintain adequate flying speed was listed as a cause factor in 460 fatal accidents with a total of 761 fatalities and 1,672 injuries. When ranking accidents by cause factors, failure to maintain adequate flying speed was determined to be the No. 1 cause of all fatal accidents, the No. 2 cause of all accidents involving fatalities, and No. 1 in accidents involving injuries.

The accident and fatality rate caused by inadequate flying speed has been decreasing since 1980 with the accident rate per 100,000 hours dropping from .89 in 1980 to .59 in 1984. The fatality rate has dropped from 1.94 in 1980 to 1.60 in 1984.

Pilots of all certification levels were involved in these types of accidents. Private pilots had the greatest number, commercial pilots were next, followed by student pilots, and then airline transport pilots.

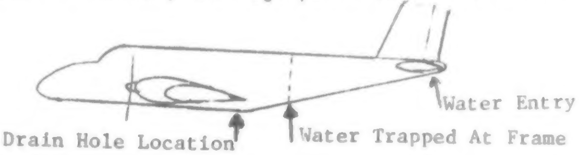
Aircraft groups that have the greatest accident rates are the agricultural aircraft. Next are the training types of aircraft, but the agricultural aircraft have as much as five times the accident rate of training aircraft. In examining the type flying involved in inadequate airspeed caused accidents, it is apparent that aircraft used for personal pleasure flying and training are the aircraft with the largest number of occurrences. Agricultural and instructional type flying are second and very close in number of occurrences.

The data indicates that experience in make and model aircraft is a very significant factor in stall type accidents caused by inadequate airspeed. During this 5-year period, the data shows that pilots with 25 hours or less in specific make and model of aircraft had four times as many accidents caused by failure to maintain adequate flying speed as those pilots that had 75 hours or more in a specific make and model of aircraft. Flight instructors should be urged to place more emphasis on stalls when checking out pilots in new makes and models of aircraft. Pilots should be aware of these facts and use proper precautions when they have minimum experience in a specific make and model of aircraft.

MAINTENANCE NOTES

WATER DRAINAGE

An air-taxi airplane was hosed down in a warm hangar before flight on a cold day. Water inside the aft fuselage became trapped at a frame before it could reach the drain hole. The water froze during flight, encased the elevator cables and pulleys in ice, and rendered the elevator inoperative. This example illustrates the importance of maintaining normal drainage paths inside the fuselage. Dirt and debris should not be allowed to collect inside the fuselage to the point where it can block stringer cutouts and other normal drainage paths. Likewise, drainage paths should be considered in the design of repairs and modifications.



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NOVEMBER 1986

Improve Reliability-Interchange Service Experience

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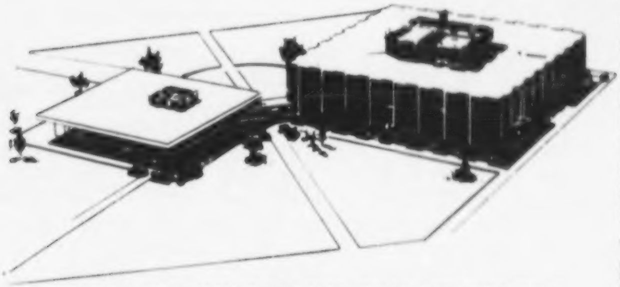
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C. 20590

ADVISORY CIRCULAR
AC 43-16

GENERAL AVIATION AIRWORTHINESS ALERTS

NOVEMBER 1986



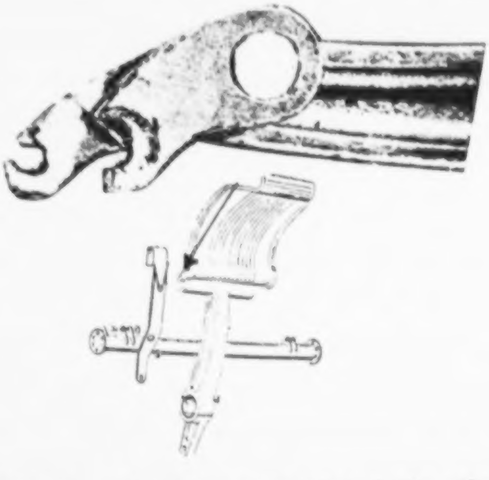
AVIATION STANDARDS NATIONAL FIELD OFFICE
MIKE MONRONEY AERONAUTICAL CENTER

The General Aviation Airworthiness Alerts provide a common communication channel through which the aviation community can economically interchange service experience and thereby cooperate in the improvement of aeronautical product durability, reliability, and safety. This publication is prepared from information submitted by those of you who operate and maintain civil aeronautical products. The contents include items that have been reported to be significant, but which have not been evaluated fully by the time the material went to press. As additional facts such as cause and corrective action are identified, the data will be published in subsequent issues of the Alerts. This procedure gives Alerts readers prompt notice of conditions reported via Malfunction or Defect Reports. Your comments and suggestions for improvement are always welcome. Send to: Aviation Standards National Field Office, Attn: AVN-110, P.O. Box 26460, Oklahoma City, Oklahoma 73125.

AIRCRAFT

BEECH

Beech Models 58 Series, 65, 65-80 Series, 65-88, 65-90, 90 Series and 99 Series	Rudder Pedal Arm P/N 50-524326



The holes in the rudder pedal arms have been found excessively worn and, in some instances, have completely broken out. The reports indicate these conditions may have been the result of abnormal force used in repeated brake application and when setting or releasing the parking brake. Changes have been made to include a steel bushing at the brake pedal attachment. Beechcraft Airliner Communique No. 25 and King Air Communique No. 42 contain guidance information and rework procedures relative to installing the steel bushings.

NOTE: The above article was published in previous Alerts. A recent report stated the pilot's right rudder pedal arm broke out on a Beech 58 with 6,485 hours.

Beech Model 76	Cracked Aileron Mount Bracket	The ailerons had excessive side movement. The ailerons were removed, and both the left and right inboard bearing mount brackets were found cracked. The cracks were in the top and bottom protruding from the outboard edge of the bracket to the rivet holes. Aircraft time - 1,688 hours.
Beech Model C90	Broken Door Cable	The lower cable assembly broke when a passenger stepped on the cabin door lower step. The door hit the fuselage to wing fairing causing damage to the fairing and to the door. The covering over the cable makes broken strands difficult to detect. The submitter suggests a thorough inspection of the cable, especially on aircraft with around 3,000 operating hours.
Beech Model 300	Nose Steering Spring Retainer P/N R50-820038	The nose steering spring is retained in its housing by a four-lobed snapring. The snapring drops into four slots in the housing. The snapring had broken into four pieces and some pieces fell out when the nosewheel was turned from left to right. The loss of all the broken pieces would have caused the loss of nosewheel steering. The submitter advised the snapring may have been brittle from heat treating, or work hardened, causing breakage. Aircraft time - 600 hours.

BELL

Bell Model 206BIII	Worn Splines	During transmission overhaul, the sun gear splines and shaft inner splines were found severely worn from lack of lubrication. The submitter recommended a 500-hour inspection and repack of the sun gear and shaft.

BRITISH AEROSPACE

British Aerospace Model Jetstream 3101	Autopilot-Replacement of Elevator Trim Servo Motor	BAe issued an alert service bulletin (CAA-UK Mandatory 22-A-JA 860413 DAI/1743/44) dated April 16, 1986, to replace servo motors, BAe Part No. 03735126K401, within 50 hours time-in-service or 15 days, whichever is sooner, from receipt of BAe alert service bulletin. A case has occurred where the fracture of leaf spring in the solenoid assembly of the elevator trim servo motor drive gear assembly remained engaged even with the solenoid deenergized on disengagement of the autopilot. Greater effort will be required to rotate the elevator trim control handwheel when manually retrimming the aircraft in this condition.

SAFETY IS NEVER SIGNING OFF ANYTHING YOU HAVEN'T REALLY

LOOKED AT - AND WOULDN'T FLY IN YOURSELF !

CESSNA

Cessna
Single Engine
Models

Adjustable Seat
Assemblies

Numerous reports indicate that difficulties continue to be encountered with seat attachments, structure, locking mechanisms, tracks, and stops. When required inspections are made, it is suggested the following items be examined:

1. Check the seat assembly for structural integrity.

2. Inspect the roller brackets for separation and wear.

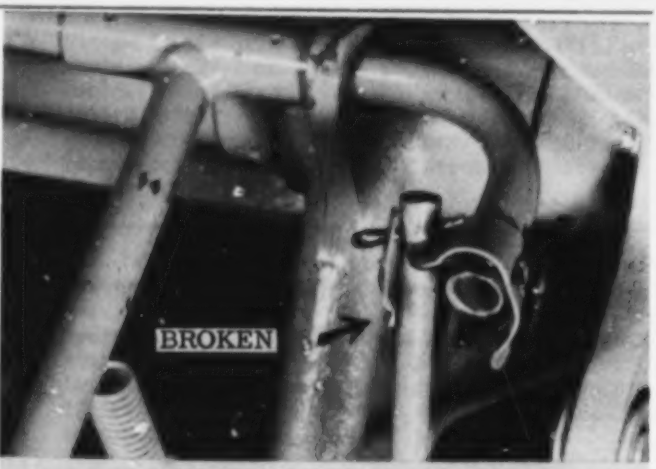
3. Examine the locking mechanism (actuating arm, linkage, locking pin) for wear and evidence of impending failure.

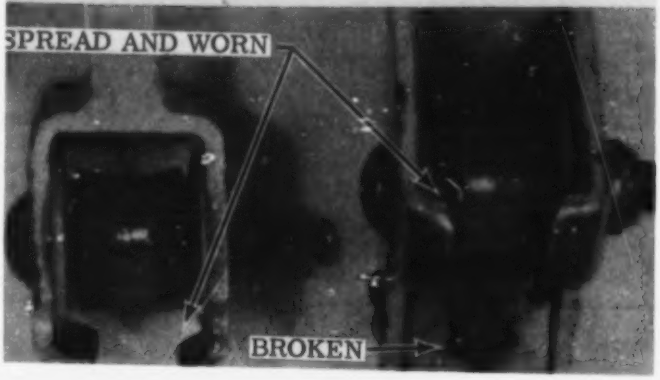
4. Inspect the floor mounted seat rails for condition and security, locking pinholes for wear, and rail stops for security.

5. Determine that the floor structure in the vicinity of the seat rails is not cracked or distorted.

Defective or worn parts are a potential hazard which should be given prompt attention. Accomplish repair and/or replacement of damaged components in accordance with the manufacturer's service publications.

NOTE: This article was previously published in Alerts No. 60 dated July 1983. The same type problems are still being reported.





TRACK DAMAGE

Cessna
Model 150

Chafed Oil
Pressure Line

Engine oil pressure indication was slow during engine start. Investigation disclosed a hole chafed into the aluminum line from the firewall to the oil pressure gauge. The line had been chafing the radio cooling hose. The submitter advised the line is above the glove compartment box and cannot be seen unless the box is pulled.

Cessna
Models 172RG
and R182

Landing Gear
Downstop Pad

The following information is contained in Cessna Single Engine Service Bulletin SEB86-1: "An improved downstop pad has been incorporated on production airplanes and is made of solid metal to provide improved service life. The new improved pads are directly interchangeable with the earlier urethane layered pad, and may be installed on inservice airplanes whenever downstop pad replacement is required."

Cessna Single Engine Models except 177, 177RG 190, 195, 210 Series after 210G

Wing Struts

In the event deep scratches or cuts are found in the wing struts, the following criteria should be used to determine whether replacement is necessary.

A. If the groove exceeds 0.010 inch in depth and is less than 0.75 inch from a rivet center, the strut should be replaced.

B. If the groove is more than 0.75 inch from a rivet center, the strut should be replaced if the groove depth exceeds:

0.030 inch for Models 150 and 172 Series
0.025 inch for Models 180, 182, and 188 Series
0.020 inch for Models 185, 205, 206, 207, and 210 Series

C. If the groove depth is less than specified for the particular model or location above, it should be repaired by tapering gradually to the original surface and burnishing to a smooth finish. In addition, the area should be checked with dye penetrant to insure that no crack has developed.

Cessna Models TU206 and T210 Series

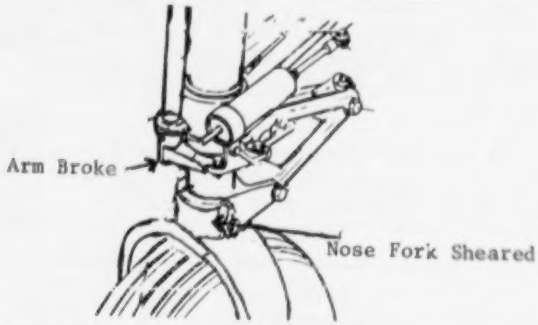
Alternate Air Door

The magnetic latch of the alternate air door assembly was found in poor condition with the magnet and hinge severely worn. The magnet assembly fell apart upon removal. If the magnet had broken loose, it would have been ingested in the turbo. The submitter suggests the door be checked for proper rigging to reduce the chance of vibration.

Cessna Model 210B

Broken Steering Shaft

The nose steering lower arm failed at the weld joint during flight or on gear extension. The pilot reported a stiff rudder pedal during final. Apparently, the pilot was working against the nosegear as the nosewheel was approximately 50° off center. Upon nosegear touchdown, the gearfork sheared at the strut and departed the aircraft. Aircraft time - 3,600 hours.



Cessna Model 400 Series

Emergency MLG Extension

Several reports have been received concerning slippage of the landing gear emergency blowdown actuator cable housing in the support clamp at the blowdown bottle. This slippage can result in failure of the blowdown system to actuate when the "T" handle in the cockpit is pulled. Cessna has issued Service Information Letters ME81-28 and PJ81-22 to provide an improved replacement clamp that alleviates this problem. It is recommended this new clamp be installed if not already accomplished. Aircraft models affected: Model 402C, S/N's 402C0001 through 402C0602; Model 404, S/N's 404-0001 through 404-0859; Model 414A, S/N's 414A0001 through 414A0659; Model 421C, S/N's 421C0001 through 421C1073; Model 425, S/N's 425-0002 through 425-0051; Model 441, S/N's 441-0001 through 441-0206, 441-0208 through 441-0214 and -0218.
NOTE: The above article was published in Alerts No. 65 dated December 1983. There was a recent report of a Cessna 404 landing gear up because of cable slippage in the clamp preventing actuation of the blowdown bottle. Apparently, the improved replacement clamp had not been installed.

Cessna Model 402C	Engine Baffle Assembly P/N 0851838-41	The pilot reported that during cruise, the left propeller control jammed and the propeller could not be feathered. There were no problems with the control after landing. Investigation revealed damage to the left engine left forward baffle and chafe marks on the propeller syncrophase mechanism attached to the propeller governor control head. Simulating an airload on the ground confirmed the problem. The submitter recommends inspecting for evidence of chafing or baffle damage.
Cessna Model 421C	Corroded Downlock	The left maingear collapsed while the aircraft was exiting the runway. Investigation disclosed heavy corrosion in the downlock area where hydraulic fluid pools. There was no corrosion in the cylinder barrel area. Apparently, corrosion interfered with the operation of the downlock. Inspection of the area for condition was recommended.
Cessna Model 500	Gear Indicating Light	The nosegear light indicated an unsafe condition after extending the gear. It was determined that the indicator was at fault, and a safe landing was accomplished. Investigation revealed the socket for the nosegear indicator light was not fully seated in the light assembly. Make sure that sockets are locked in the light assemblies and function properly after bulb replacement. The submitter advised that the plastic light assemblies are subject to wear.

ENSTROM

Enstrom Model 280F	Push-Pull Tubes P/N 28-16253-1	During an annual inspection, the push-pull tubes that run through the mast had evidence of rust coming out from around the rivets that attach the lower stainless steel fitting to the 4130 tube. Removal of the rivets revealed the tubes were rusted inside. This aircraft was exposed to outside elements for long periods of time. The submitter advised that the sealing methods did not prevent water entry into the tubes. It was suggested the tubes be inspected for condition.

GULFSTREAM AEROSPACE

Gulfstream Model 112TC	Mixture Control Cable	The mixture control cable separated at the swaged end where it attaches to the injector unit. The throttle control cable had the same problem a short time previously. Both cable separations were found during oil changes. The submitter advised that both cables are subjected to high heat from the tubrocharger unit and suggests some form of shielding. Aircraft time - 1,673 hours.

PIPER

Piper
Model PA-28-160

Corroded Flap

Blistered paint was observed on the left lower flap skin during an annual inspection. Further inspection revealed the spar and a rib were severely corroded. Rodent infestation contributed to the severe corrosion.

Piper
Model PA-30

Cracked Fuel
Injector Lines

During an annual inspection, five lines were found cracked. The cracks were at the silver soldered joints where the lines attach to the fuel manifold distributor on top of the engine. One "B" nut was also found cracked. This was the second aircraft found recently with cracked and leaking injector lines. The injector lines apparently have the same time as the airframe which was 3,800 hours.

Piper
Model PA-32-301T

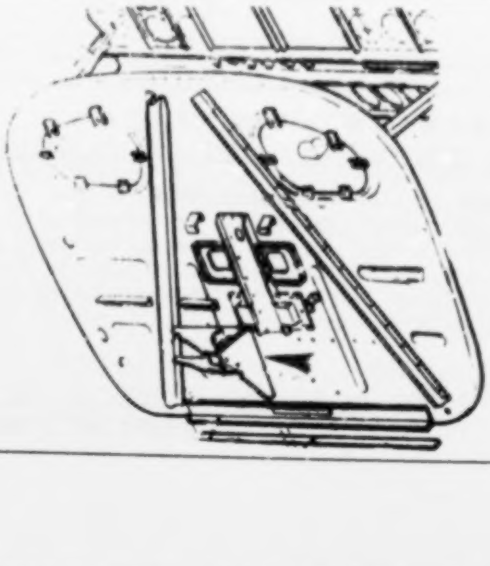
Ignition Switch
Support Plate Kit
P/N 10-357510

The engine would continue to run with the switch held in the OFF position. Bendix advised that installing the support plate kit should correct the problem. The submitter advised the new support plate kit has twice the area as the removed plate and, since installation, the switch works properly.

Piper
Model PA-34-200T

Actuator Mount Assembly
P/N 95724-02

The nosegear collapsed during landing roll. The aircraft received extensive damage to the forward fuselage, engines, and propellers. Investigation revealed the rivets securing the nosegear hydraulic actuator aft mount assembly had sheared. This aircraft had recently received an annual inspection with no malfunction or defects found in this area. The submitter suspects the rivets were sheared by movement of the aircraft on the ramp by line personnel.
NOTE: A related article was published in Alerts No. 90 dated January 1986.



Piper Model PA-34-200T	Maingear Trunnion P/N 67926-14	The pilot reported a hydraulic leak at the left maingear strut assembly. Investigation revealed a crack at the outboard side of the trunnion. The crack was approximately 3 inches up from the trunnion bottom. Piper Service Bulletin 787A requires inspection of the trunnion housing at the lower end of the fillet. This crack occurred approximately 90 degrees toward the outboard side. The submitter recommends that the inspection requirements of SB 787A include the complete radius of the trunnion.
Piper Model PA-44-180	Broken Throttle Cable	The pilot could not retard the left engine throttle prior to landing. The propeller was feathered and a safe landing accomplished. Investigation revealed the left throttle cable had broken at the quadrant end. Inspection of the right throttle cable disclosed the cable badly frayed and nearly broken at the quadrant end. The problem was caused by misalignment at the carburetor support bracket. Airworthiness Directive 79-05-11 and Piper Service Bulletin No. 639 pertain to the problem.
Piper Model PA-60-600A	Preheated Propeller Cable	The engines were preheated with a propane type heater. After preheating the engines, both propeller control cables were unmovable. Investigation revealed the preheating had melted the inner plastic sleeve in the propeller cables. The melted plastic seized the cables, preventing movement. The submitter suggests caution be taken to keep preheaters away from cables and other plastic-type parts.
Piper Model PA-60-602P	Flap Binding	A split flap condition occurred during a preflight inspection. Investigation revealed the left inboard flap track and roller were void of lubrication causing binding. Inspection for condition and proper lubrication was recommended. Aircraft time - 600 hours.

SCHWEIZER

Schweizer Model G-164	Carburetor Heat Box Cables	The pilot advised of engine power loss. Investigation disclosed the carburetor heat box cable was broken at the box. This resulted in carburetor heat being in the full on position. The submitter advised this was the second identical occurrence he has observed on this model aircraft.

ACCIDENTS AND INCIDENTS WILL NEVER BE PREVENTED -
IF THE NEAR ACCIDENTS AND INCIDENTS ARE NEVER REPORTED.

ACCESSORIES

CHAMPION

Champion Oil Filter Model CH48103	Metal Shaving	Low oil pressure was experienced 2 operating hours after installing a new oil filter. Investigation revealed what appeared to be a piece of thread cutting material under the oil pressure relief valve ball. Inspection of other new filters revealed chips and metal shavings inside the filter. This submitter suggests use of a swivel end mechanic's magnet inside the threaded opening to pull out any loose metal prior to installation. NOTE: Related articles have been published in previous Alerts.
Champion Oil Filter Model CH48108	Oil Filter Leak	The oil filter was installed during a 100-hour inspection. Four quarts of oil leaked from a small hole above the lower seam on the filter during engine run and operational check. The submitter advised the seam appeared to open due to pressure during initial engine start.

FACET AEROSPACE PRODUCTS CO.

Facet Carburetor Model MA-3A	Float Assembly P/N 30766	The engine lost power during the takeoff roll. Investigation revealed one float had been touching the inside of the bowl and had worn a flat spot on the float. The float caught in the up or closed position restricting fuel flow to the engine.

SLICK

Slick Magneto Model 4251	Impulse Coupling P/N M-3163	A new impulse coupling failed the 1/8-inch drill shank check as specified in Slick Form 1037C. This was the second new coupling failing the test. Five couplings were found during the 500-hour magneto inspection which did not meet the 1/8-inch drill shank measurement check. The submitter suspects defective impulse couplings are being installed on new magnetos.
Slick Magneto Model 4251	Rear Bearing Failure	The left magneto on a Cessna 152 was inoperative during engine runup. Removal of the magneto disclosed it was binding when rotated. Further inspection revealed the rear bearing was void of lubrication. The bearing race had spun in the housing and deposited fine aluminum particles throughout the magneto, shorting the coil and points. Magneto time - 230 hours.

ENGINES

ALLISON GAS TURBINE DIVISION

Allison Model 250 Series Engines	Hot Starts, Overtemperature Operation, and Shutdown Afterfires

The Operations and Maintenance Manuals for Allison Model 250 Series engines provide the following continued airworthiness information:

WARNING

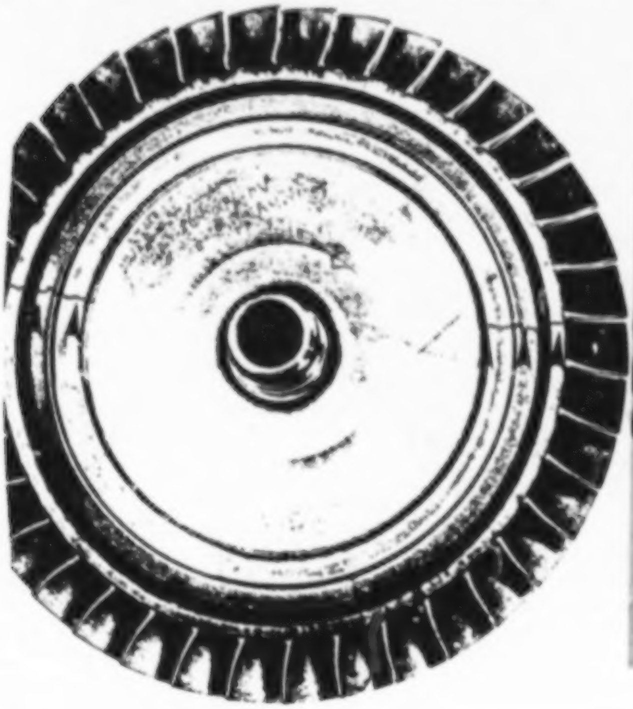
TO PREVENT SERIOUS ENGINE MALFUNCTION OR CRUCIAL LOSS OF POWER, DO NOT OPERATE THE ENGINE IN EXCESS OF ANY SPECIFIED LIMIT.

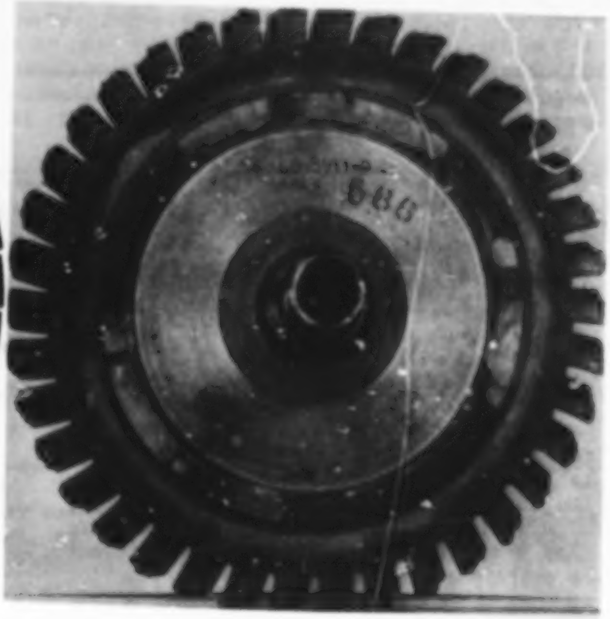
WARNING

HOT STARTS OR AFTERFIRES AFTER SHUTDOWN WILL CAUSE TURBINE BLADE AND WHEEL DAMAGE WHICH CAN RESULT IN ENGINE FAILURE.

On occasions in the past, failure to start, operate, shutdown, and maintain the 250 series engines within the limits specified in the applicable Operations and Maintenance Manual has resulted in overtemperature conditions. Overtemperature starts/operation or shutdown afterfires will cause cracks in the first stage turbine wheel rim. These cracks can progress to an "out of limit condition" which could eventually cause a wheel failure/uncontained failure with potential hazard to the aircraft.

The photographs indicate a cracked wheel and burned blades on first stage turbine wheels that were found upon inspection resulting from pilot reports of overtemperature conditions. Strict adherence to Allison recommended starting, operating, shutdown, maintenance, and reporting procedures will preclude/essentially eliminate the occasional risk of overtemperature conditions resulting in first stage turbine wheel failures/uncontained failures.





CONTINENTAL

Continental Model TSIO-520-R	Cracked Cylinder	The pilot reported the aircraft had developed a severe vibration and was unable to achieve full power from the engine. Investigation disclosed the No. 5 cylinder was cracked and would not hold compression. A serviceable cylinder and piston assembly was installed, and engine performance was normal. NOTE: Airworthiness Directive 86-13-04 pertaining to the cracked cylinder problem has been issued.
Continental Model TSIO-520-WB	Propeller Oil Transfer Plug	The engine manifold pressure (MAP) revolutions per minute (r.p.m.) and fuel flow (FF) would fluctuate intermittently when the aircraft went into a slight descent. After many component changes, the crankshaft oil transfer plug was removed for inspection. Oil sludge was found in the inner chamber of the plug restricting oil flow from the propeller to the propeller governor. This condition was found in both engines on a Beech Model 58P aircraft. The fluctuations would average 1.5-inches MAP, 25 r.p.m., and 1 gallon per hour FF. Time on the engines since new - 1,105 hours.

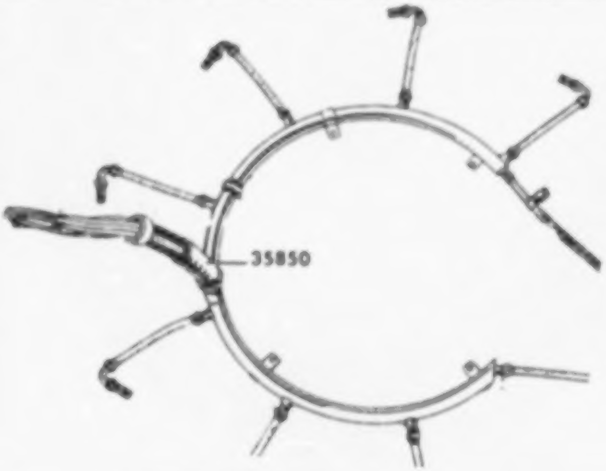
GARRETT

Garrett Model TPE-331-10	Oil Filter Deterioration	One propeller on a MU-2B went to feather position on engine shutdown and would not go back on the locks with the pump. Investigation revealed the oil filter had collapsed and implanted paper throughout the oil system. Time on the filter - 22 hours.

PRATT AND WHITNEY

Pratt and Whitney Model R985	Magneto Conduit Guard P/N 35850

A rough running engine caused an unscheduled landing in a hay field. Investigation disclosed the aft ignition harness conduit was deteriorated which allowed oil to enter the interior of the left magneto. The leather conduit guard had not been installed. The conduit is routed below the oil tank filler and spilled oil can enter the ignition harness. The submitter advises that the importance of the guard to prevent oil or moisture from entering the ignition harness cannot be overemphasized.



OF INTEREST

PRIST PLASTIC TUBE BREAKING

During the past year, an operator had two quick drain fuel valves fail in the open position during fuel sampling. A piece of plastic tube from a Prist container was found lodged in each drain valve. The submitter advises the plastic tube becomes brittle and breaks easily when subjected to cold conditions. He recommends the manufacturer consider redesign of the plastic dispensing tube to help eliminate breakage and entry into the fuel system.

PHILLIPS 20W-50 X/C II OIL

There were 26 Malfunction or Defect Reports during the month of June 1986 concerning Continental and Lycoming engines with sticking valves, loss of power, and bent pushrods where the type oil used was Phillips 20W-50 X/C II.

Teardown of the engines disclosed a residue on valve stems and guides described by some as ash, carbon, and varnish. Supplemental Type Certificate No SE5879SW allows the use of Phillips 20W-50 X/C II oil in these aircraft engines.

There was a report in July 1986 that Phillips Petroleum had discontinued production of the 20W-50 X/C II oil.

WINTER OPERATIONS

This article was excerpted from a Special Issue General Aviation Airworthiness Alert issued in December 1985.

Anti-icing Additives

While proper fuel sampling and sumping is essential in preventing the formation of ice due to free water in the fuel, it will not eliminate the hazard of ice blockage of fuel flow. Under certain conditions, water in suspension or solution may form ice crystals. Since water in suspension or solution is not removed by sumping, the formation of ice crystals must be prevented by adding anti-icing additives, such as isopropyl alcohol or ethylene glycol monomethyl ether (EGME), to the fuel. Both additives absorb water and reduce the freezing point of the mixture. Teledyne Continental Motors and Avco Lycoming approve the use of both additives in their engines, subject to approval by the respective airframe manufacturers. When alcohol or EGME are used, instruction for their proper use must be carefully followed. Obtain and follow the aircraft and engine manufacturer's recommendations regarding the use of anti-icing additives in the fuel for your aircraft.

Draining Sumps

Proper sumping is very important during the preflight check. Sufficient fuel should be drawn off into a transparent container to see if the fuel is free of contaminants. Extra care should be taken during changes in temperature, particularly when it nears the freezing level. Ice may be in the tanks, which may turn to water when the temperature rises, and may filter down into the carburetor or fuel controller causing engine failure. Water can freeze in lines and filters causing stoppage. A small amount of water, when frozen, can prevent proper operation of fuel pumps, selector valves, and carburetors.

Snow and Ice Removal

Aircraft easily accumulate snow, ice, and frost. Snow and ice are obvious and must be removed before flight. Frost, however, is more deceptive. Frost not only increases gross weight, it drastically alters the lift-drag ratio of an aircraft making takeoff extremely hazardous. There is no such thing as a little frost on aircraft surfaces. The only conditions that apply are none or some - and some is too much. Never risk aircraft damage by chipping or scraping it off; let the warmth of a hangar or deicer do it gently.

Where removal of deposits must be accomplished outside, the use of a nonflammable deicing fluid, such as one containing a glycol base, is quite effective. This type of remover has an additional advantage in that the slow rate of evaporation, coupled with its viscosity, leaves a protective film on the surfaces which dissipates slowly thereby providing a latent degree of protection. Protection decreases with time and melting snow diluting the fluid.

The glycol solution should not be applied to acrylic plastics as it may cause crazing. Do not spray the deicing fluid into pitot tubes, static ports, or engine inlets. The inaccessibility of the horizontal stabilizer on T-tail aircraft makes it easy to overlook when inspecting and deicing these aircraft.

An item often neglected, and the source of many problems, is the landing gear of aircraft operating from mud, snow, and slush covered surfaces. Experience has proven it wise to remove most types of wheel streamline covers from fixed-gear aircraft during the winter months even though it results in a never-ending job of trying to keep the aircraft clean. This practice eliminates the possibility of mud, slush, etc., building up between the tires and streamline covers and then freezing into a solid mass. On retractable-gear aircraft, the integrity of shields, boots, and curtains used to protect actuating devices and switches must be maintained. In addition, retraction mechanism lubrication, in accordance with the manufacturer's recommendations, cannot be overstressed. Oleo struts should be serviced with nitrogen for winter operations. Otherwise, ice crystals can form in the hydraulic fluid and cut the seals. The struts should also be wiped with clean hydraulic fluid to remove snow, ice, and dirt. Improperly rigged skis are also a relatively common source for accidents each winter.

Refreeze Problems

Make sure there is no melted ice (water) on the aircraft that can refreeze on surfaces, in flight control areas, or landing gear mechanisms when they are out in the cold again. Small quantities of water accumulating in places such as control surfaces may create a condition of static unbalance that would seriously impair the operational control of the aircraft in flight. Check the pitot head area and static ports for any refreeze water that may create turbulent air flow.

Water freezing in accessories may also cause a problem. For example, a pilot could not get either alternator on the line after starting both engines. Investigation revealed that moisture trapped in the alternators had frozen the rotor preventing rotation. When the starters engaged, the alternator drive pad couplings sheared.

Check drain holes in pitot tubes, wings, stabilizers, flight control surfaces, fuselages, and airscoops to make sure they are unobstructed and capable of serving their intended purpose. Systems should be checked for the presence of water in accordance with the appropriate aircraft manufacturer's recommendations. Special attention should be paid to deicer boots and prop deicers.

Maintenance and operations personnel should leave propellers on parked aircraft in a position that will reduce the chance of water accumulating in the spinner cavities causing unbalance and resulting in damage when the engine is started and run. In order to prevent prop oil congealing and the prop becoming inoperative during flight in very cold weather, it may be necessary to exercise the constant speed prop every few minutes by moving the prop controls forward and back during flight. Be careful and avoid overspeed.

Winterization Kits and Procedures

Cold weather operation of the aircraft engine involves conditions that require special preparations and precautions as compared to normal weather operation. Vaporization of the fuel becomes difficult, and the high viscosity of oil causes reduced cranking speed with accompanying high loads on the starter.

Often the accessories fail because of congealed oil. This is very evident by the increased number of oil cooler failures on reciprocating engines in cold weather. Excessive priming washes the oil from the piston rings and cylinder wall causing piston scuffing and scoring of the cylinders. If your aircraft engine has 50 weight oil for operation in warm weather, consider changing to a lower viscosity oil (generally 30 weight), before flying in very cold weather.

Some aircraft use winterizing kits to maintain desired engine operating temperatures and to prevent oil coolers and vapor vent lines from freezing. Any questions regarding the utilization of such kits should be directed to the appropriate aircraft manufacturer. Attention to such details as warming up the engine before takeoff and allowing the engine to cool down prior to shutting it off pays dividends in many ways, especially at overhaul time. Good practices would also include a check of the carburetor air heat system and the degree of heat rise available. At the same time, the engine idle r.p.m. and mixture, with and without carburetor air heat, should be checked.

Engine Preheat

Some precautions should be considered when using aircraft preheat. The following recommendations regarding aircraft preheat are from Advisory Circular 91-13C:

"(i) preheat the aircraft by storing in a heated hangar, if possible;

(ii) use only heaters that are in good condition and do not refuel the heater while it is operating;

(iii) during the heating process, do not leave the aircraft unattended and keep a fire extinguisher handy;

(iv) do not place heat ducting so it will blow hot air directly on combustible parts of the aircraft; such as, upholstery, canvas engine covers, or flexible fuel, oil, and hydraulic lines;

(v) when using a "fire pot" (salamander) for heating, it is suggested that wire mesh be inserted in the ducting between the pot and the engine to stop flaming pieces of carbon from entering the aircraft or engine compartment."

Things to Watch For

The crankcase breather deserves special consideration when preparing for cold weather. Frozen breather lines have created numerous problems. Most of the water of combustion goes out of the exhaust; however, some water enters the crankcase and is vaporized. When the vapor cools, it condenses in the breather line subsequently freezing it closed. Special care is recommended during the preflight to assure that the breather system is free of ice. Reports are common of engine oil loss from blown crankshaft seals caused by pressure generated by frozen breather tubes.

Breather tubes should be inspected to ensure that the inside surfaces are clear and unobstructed. It is normal practice for the airframe manufacturer to provide some means of preventing freezeup of the crankcase breather tube. The breather tube may be insulated, designed so the end is located in a hot area, equipped with an electric heater, or it may incorporate a hole, notch, or slot which is often called a "whistle slot." The operator of any aircraft should know which method is used and ensure that the configuration is maintained as specified by the airframe manufacturer.

Jet engines can accumulate internal ice overnight and resist rotation when starting is attempted. With any indication of locked rotor, unusual noise, or low r.p.m., discontinue the start. The procedure here is fundamental. The point is to be aware that the rotors could freeze on any cold weather start and to be alert enough to discontinue the start before damaging the engine. When weather forecasts include snow, ice, or sleet, engine cowl plugs for jet engine inlet and outlet openings should be installed if aircraft is to be exposed to the elements.

Cabin Heaters

Of utmost importance is the cabin air heating systems and the dangers associated with any form of system leakage that would allow carbon monoxide to enter the area occupied by the crew and passengers. It is a good practice to supplement cabin heating system inspection with periodic carbon monoxide detection tests, especially in those cases where visual inspections are infrequent. Carbon monoxide tests are reliable and may be accomplished quickly without any disassembly operations. Such tests, however, are not conclusive as the state of the preservation and actual condition of the component parts of any heating system can only be determined by visual inspection. Fifty-five different arriving aircraft were checked at an airport and seven appeared to be exposing the occupants to increased levels of carbon monoxide. Carbon monoxide is a colorless, odorless, and tasteless gas that has long been suspected as a cause for some aircraft accidents. Don't guess about this gas, as you can't see or smell it. By the time you feel it, it may be too late. Further, the susceptibility to carbon monoxide poisoning increases with altitude.

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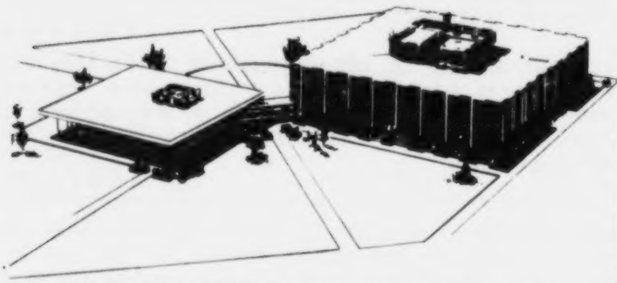
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C. 20590

ADVISORY CIRCULAR
AC 43–16

GENERAL AVIATION AIRWORTHINESS ALERTS

DECEMBER 1986



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The General Aviation Airworthiness Alerts provide a common communication channel through which the aviation community can economically interchange service experience and thereby cooperate in the improvement of aeronautical product durability, reliability, and safety. This publication is prepared from information submitted by those of you who operate and maintain civil aeronautical products. The contents include items that have been reported to be significant, but which have not been evaluated fully by the time the material went to press. As additional facts such as cause and corrective action are identified, the data will be published in subsequent issues of the Alerts. This procedure gives Alerts readers prompt notice of conditions reported via Malfunction or Defect Reports. Your comments and suggestions for improvement are always welcome. Send to: Aviation Standards National Field Office, Attn: AVN-110, P.O. Box 26460, Oklahoma City, Oklahoma 73125.

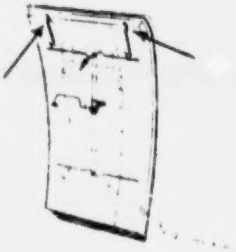
AIRCRAFT

AGUSTA

Agusta Model A109AII	Tail Boom Attach Brackets	During an inspection of the tail boom attach points, the left upper attach bracket was found cracked completely through. The entire tail boom was supported by the three remaining brackets. Additional cracks were found on the first tail rotor hanger bearing support structure. Aircraft time - 847 hours.

BEECH

Beech Model 35 Series	Ruddervater Pushrods	A report of a ruddervater pushrod being installed on the wrong side of the elevator trim cable has been received. The cable sawed 95 percent of the way through the pushrod. The pushrod failed following high winds on the ground. The submitter recommends that this area be inspected immediately if any recent work has been done on either the pushrods or trim cables.

Beech Model B60	Fuel Hose Assembly	The fire wall to engine driven fuel pump hose was found chafed and leaking during an investigation of an in-flight fire. The fuel hose was lodged between the fuel line heat shield and the exhaust. The clamp provision off the engine mount tubing was not utilized. The submitter advised the correct routing is on top of the shield and clamped inside the engine mount leg. He recommends inspection for correct installation after hose or component replacement and after engine change.
Beech Model 99 Series	Fuel Cap	On takeoff, the flight crew noticed fuel siphoning from the left fuel tank cap area. The aircraft returned, and the tank cap was found misaligned. The cap was reseated, and the airplane returned to service. Caution should be exercised when installing the fuel cap as misalignment can occur and lead to poor sealing. Several aircraft in one operator's fleet were found to require cap replacement or readjustment.
Beech Model 200 Series	Cabin Entrance Door Latching Mechanism	 Incorrect rigging of the door latching mechanism can lead to overload failure of one of the two hooks (see sketch) and complete loss of the door during flight. This has occurred on three occasions. These doors must be maintained in a properly rigged condition or such mishaps can occur. Section 52-10-00 of the Model 200 Maintenance Manual applies. NOTE: Since this article was published in Alerts No. 98 dated September 1986, information has been received of similar problems on Beech Model F90 aircraft. These doors must also be maintained in a properly rigged condition to prevent mishaps.
Beech Model 200	Emergency Exit	While performing a functional check of the emergency exit from inside the cabin, it was found to operate properly. However, when an attempt was made to open the exit using the external handle, the top edge of the handle would make contact with the skin of the exit door, thereby preventing the handle from engaging the latching mechanism. This prevented the system from operating properly. The submitter recommends performing the functional check from both inside and outside of the airplane to ensure the exit will open if needed during an emergency.

SAFETY IS NEVER SIGNING OFF ANYTHING YOU HAVEN'T REALLY
LOOKED AT - AND WOULDN'T FLY IN YOURSELF

BELL

Bell Model 222	Flapping Bearing	A mechanic found a large crack in the main rotor white blade flapping bearing after a flight. The main rotor was removed, and the blades, hub, and trunnion disassembled for further inspection. This rotor assembly had been removed several times in the past to facilitate other maintenance. The submitter advised the failed bearing is an "On Condition" item - no retirement life assigned. Time on the failed part - 2,153 hours.

BELLANCA

Bellanca Models 17-30, 17-30A, 17-31, and 17-31A	Exhaust System Failures

On September 24, 1985, a Bellanca Model 17-30A Super Viking lost engine power after the left exhaust muffler failed at the outlet. The failure permitted heat and flames to burn the engine's magneto wiring (electrical "P" lead). In 1976, the FAA issued Airworthiness Directive (AD) 76-23-03 applicable to certain serial numbered Bellanca Vikings (Models 17-30 and 17-31) and Super Vikings (Models 17-30A and 17-31A) to prevent exhaust system failures which could allow heat or flames to enter the engine compartment. The AD requires the muffler and tailpipe assemplies to be inspected for cracks and for freedom of movement at the ball joints at intervals of 100 flight-hours. If the tailpipe assemblies are not free to move at the ball joints, the bending stress created by the tailpipe and resonator can break the welded muffler outlet.

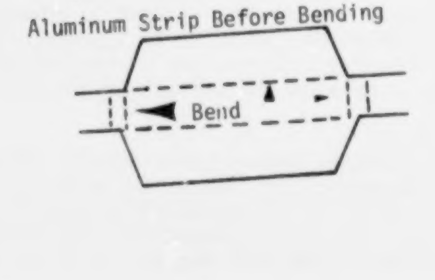
Some of these Bellanca airplanes are flown infrequently; however, the interval between the "100 flight-hour" inspection may span several years. On the Model 17-30A mentioned above AD 76-23-03 had been complied with in August 1982, but the airplane had only been operated for 50 flight-hours since then, and a comparable exhaust system inspection had not been accomplished subsequently. Similar occurrences have happened to other Bellanca Super Viking aircraft in which loss of engine power was caused by exhaust system failures which allowed hot gases to burn the "P" leads, apparently causing them to short out the magnetos.

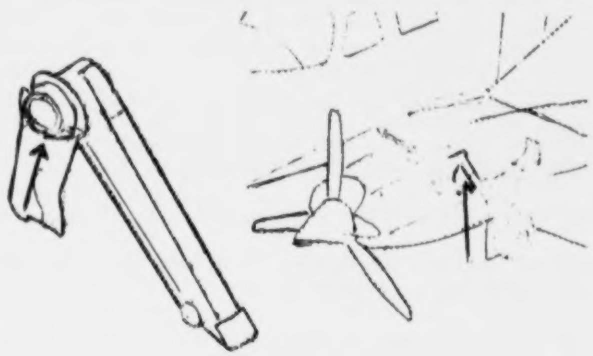
Service Difficulty Reports (SDR's) and incident reports reflect similar problems of broken tailpipe-muffler outlets in the exhaust systems of the Bellanca Viking/Super Viking airplanes. For example, between July 1981 and March 1984, seven such occurrences were noted (four SDR's and three incidents). Remarks from reports of these occurrences typically include: "Exhaust pipe broke, exhaust burned magneto leads, engine stopped."; "Smoke in cockpit, engine quit, forced landing, exhaust tailpipe broken, heat scorched wires, vapor locked fuel line."; "Inflight fire due to muffler breaking at the tailpipe segment."; and "Found muffler outlet broken off, tailpipe hanging loose, burned engine mount."

The frequency of these occurrences may have been reduced if AD 76-23-03 had required more frequent exhaust system inspections. Accordingly, it was suggested that the AD be revised to change the compliance interval to "every 100 hours time-in-service OR ANNUAL INSPECTION, WHICHEVER OCCURS FIRST." Additionally, the substance of the AD should specifically address the condition of the muffler hangar support. Failure of this part may play a role in the exhaust system problems, since it supports the weight of the tailpipe assembly.

Owners of these aircraft may improve the redundancy of the ignition system (and thereby reduce the possibility of an exhaust system problem disabling both magnetos) by complying with Bellanca Service Letter Number B-104 dated February 6, 1984. In addition to recommending that both "P" leads be replaced with high temperature shielded wire, the service letter advocates rerouting the right magneto "P" lead so it is not adjacent to the "P" lead of the left magneto as it is routed to the fire wall.

CESSNA

Cessna Models 120 and 140	Exhaust Heat Exchangers	A Model 140 airplane had riveted exhaust assemblies with missing rivets and cracks which admitted exhaust directly into the cabin heat air. The submitter recommends that all Model 120/140 airplane exhaust heat exchangers be thoroughly inspected for integrity and closely checked at scheduled inspection intervals.
Cessna Model 150	Fuel Cap Gaskets	Both fuel cap gaskets were found deteriorated. The deteriorated gaskets allowed water entry. The submitter suggests pilots and mechanics check gaskets for condition when fueling the aircraft.
Cessna Model 152	Elevator P/N 043200-85	During an annual inspection, the elevator spar was found cracked 1.5 inches in the area of the outboard hinge. The hinge bolt was loose, which allowed play and elongation of the boltholes. Aircraft time - 2,078 hours. **NOTE:** Since this article was published in Alerts No. 91 dated February 1986, there have been additional reports of finding cracks in the outboard hinge area.
Cessna Model 172	Broken Stop Bolt	The elevator stop bolt was found broken off from the bulkhead. This allowed the elevator to exceed the travel limits. The submitter advised this was the second broken stop bolt found recently and suspects high winds as the cause.
Cessna Models R172K (Hawk XP), 180, 182, 185, and 188 Series  Clamps Engine Mount Aluminum Strip Exhaust Stack Aluminum Strip Before Bending Bend	Engine Mount	There is a continuing problem with corrosion on those portions of the engine mounts which are exposed to heat from adjacent exhaust stacks. Cessna has issued Single-Engine Service Letter No. SE76-22, dated November 15, 1976, which suggests that a very high temperature enamel be applied to the areas of the engine mounts which are in close proximity to the exhaust stacks. This enamel is identified by Cessna P/N CES1054-812S. Although the service letter specifically mentions the Model A185 and A188 series airplanes with the 300 hp engine, it is recommended the enamel be used on any airplane where corrosion of the engine mounts is accelerated by elevated temperatures. Cessna Single-Engine Service Letter SE78-27 was issued on April 24, 1978, to provide instructions for the use of the very high temperature enamel on the engine mounts of the Hawk XP series airplanes. A Florida seaplane operator submitted this fix (sketch) which eliminated the corrosion problem on his aircraft. The submitter used a corrosion preventative compound under the stainless clamps. **NOTE:** Article previously published in Alerts No. 63 dated October 1983.

Cessna Model 182P	Carburetor Inlet Duct	Upon inspection of the lower cowl during routine maintenance, the lower surface of the P/N 0752602-13 duct was found cracked and extremely flexible to the point of air leakage. This could lead to possible engine damage due to ingestion of fractured metal debris into the engine induction system. Damage is not readily apparent without looking down the duct.
Cessna Model 210N	Door Hinges Cracked	Inspection of the door hinges on two aircraft revealed over half the pins seized and hinges cracked. Inspection for condition and lubrication was recommended. Aircraft times were 2,000 and 2,200 hours.
Cessna Model T303	Landing Gear Retraction Arm Assemblies	There have been several reports of cracked/broken main landing gear retraction arm assemblies, P/N's 2541080-1 and 2541080-2. This problem is caused by overtravel of the retraction actuator placing high stresses on these arm assemblies. Cessna has designed new retraction actuators to correct this problem. These actuators are described in Cessna Service Bulletin MEB85-17, Revision 1. The submitter recommends this Bulletin be incorporated. 
Cessna Model T303	Vertical Stabilizer Bolts Loose	The Service Difficulty Report (SDR) data bank contains seven reports on Cessna Model T303 airplane vertical stabilizer structure section. These reports were processed during the 4-year period from July 26, 1982, through July 17, 1986. There has been a recent upward trend in reporting, as six of the seven reports were processed in the 7-month period beginning December 30, 1985, and ending July 17, 1986. Analysis of the SDR data determined that loose vertical stabilizer mount bolts were responsible for the high report rate. Of the seven reports, six cited loose vertical stabilizer mount bolts which were discovered during inspection. One of the submitters stated finding four of the eight bolts loose and two of the nuts cross threaded. Reported total time at failure averaged 909 hours and ranged from 247 to 2,500 hours. Review of the Cessna Model T303 service information and airworthiness directive (AD's) through Biweekly Issue 86-12 revealed two AD's, 85-11-05 and 86-01-01, and Service Information Letter ME 82-47 which pertain to Cessna Model T303 vertical stabilizer section, but not to this specific problem. **NOTE:** Related articles were published in Alerts No. 93 dated April 1986 and in No. 94 dated May 1986.

Cessna Model 310K	Corroded Torque Tube	The elevator was removed to replace a broken hinge. While replacing the hinge, corrosion was found on the inside of the elevator torque tube assembly. The corrosion was removed, and the torque tube was treated. The elevator and the tube had not been previously removed from the 4,000-hour aircraft.
Cessna Model 402C	Elevator Trim Actuator	During flight transition from climb to cruise configuration, the control yoke shook violently with an extreme aircraft nose-up tendency. The aircraft was landed without incident. Investigation disclosed the elevator trim actuator screw assembly was disengaged from the actuator shaft. Worn threads apparently caused the disengagement. The actuator was adequately lubed and appeared to have been properly maintained. Time on the unit - 2,136 hours.
Cessna Model 402C	Emergency Crossfeed Shutoff System	

The following article was submitted by an operator of Cessna 402C aircraft.

Due to recent incidences of pilots checking the EMERGENCY CROSSFEED SHUTOFF SYSTEM, the following discrepancies have been found:

Due to the design of the system, it may be possible for the actuator wire to bend or break and not activate the emergency shutoff.

Since the cable moves towards the housing, or shortens at the control lever end, any slight restriction of the cable may cause it to break or bend.

The actuation mechanism must move 90 degrees to have full activation of the emergency shutoff.

The cable is of the same type of design as a carburetor heat cable. When the cable is in the normal position there are approximately 3- to 4-inches of unsupported wire extending past the outside housing.

I have not been able to find any provision for checking the system on a regular basis. Pilots' preflight portion of the Aircraft Flight Manual only allows for a check to be sure it is in the NORMAL POSITION.

The system is not designed to be operated 3 to 4 times a day.

For our operation, we will have maintenance do an operation check at each inspection period, or each 100 hours. This will be accomplished by putting both fuel selector levers into the crossfeed position, activate the EMERGENCY SHUTOFF and both engines should begin to quit in about 20 to 30 seconds, moving the lever back to the normal position both engines should continue to run. Then maintenance can open up the inspection panel in the wing and check that the crossfeed is in the FULL OPEN POSITION.

This same problem could occur in other Cessna 402C model aircraft. The 402B does not have this provision.

I would recommend to CESSNA they could use a cable like their alternate air cable.

ACCIDENTS AND INCIDENTS WILL NEVER BE PREVENTED -
IF THE NEAR ACCIDENTS AND INCIDENTS ARE NEVER REPORTED.

Cessna Model 404	Hydraulic Fluid Loss	Investigation into why the landing gear failed to extend normally revealed the left hydraulic pressure line was cracked causing loss of fluid. Line vibration was believed to have caused the line to crack. The submitter recommends additional line clamps to reduce vibration stresses. Aircraft time - 2,714.

DEHAVILLAND

DeHavilland Models DHC-6-100, -200, -300	Wings - Additional Drain Holes	Reports from the field have confirmed that water accumulates within the wing structure adjacent to the root ribs. It was recommended that incorporation of Modification No. 6/1868 in DeHavilland Service Bulletin (S/B) No. 6/485 dated July 4, 1986, be accomplished at the operator's earliest convenience. The modification consists of drilling eight additional drain holes in the lower skin of each wing forward and aft of the main spar adjacent to the root and second rib. Hole size and locations are given in the S/B.

MCDONNELL DOUGLAS HELICOPTERS

McDonnell Douglas Helicopters
(Hughes)
Model 369 Series

While troubleshooting the auto reignition system for not operating during ground runs, it was discovered that the aircraft had an hourmeter collective switch installed and was disabling the auto reignition as well as the hourmeter with the collective down. It is common practice for operators to install collective hourmeter switches and, in fact, is required by certain agencies when operating helicopters for them.

The auto reignition system in the McDonnell Douglas 369 Series prior to 369D serial number (S/N) 950D is a manually armed system. A separate switch must be placed in the armed position to activate the system. After S/N 950D, a new system was implemented which automatically arms the system when main rotor transmission pressure closes a switch to ground. The problem arises from the fact that the closed pressure switch is there to operate the hourmeter and the auto reignition is simply spliced into the negative terminal of the hourmeter. One wire (D506A20) provides the ground circuit from the hourmeter back to the main rotor transmission pressure switch. It is this wire that operators install a series switch which is activated by the raising of the collective lever. This series hourmeter collective switch performs the desired function of preventing flight time accumulation while on the ground, but also inadvertently disables the auto reignition system as well.

This can present a situation where, in the event of an in-flight engine flameout, the immediate and proper pilot response of lowering the collective lever will inadvertently disable the auto reignition system.

An hourmeter collective switch is still compatible with the automatic arm reignition system by simply insuring that the arm ground circuit wire (J508C20) is not interrupted by the series collective switch.

NOTE: Article submitted by a helicopter service center.

PIPER

Piper
Model PA-23-250

Exhaust Assembly
P/N 33419-03

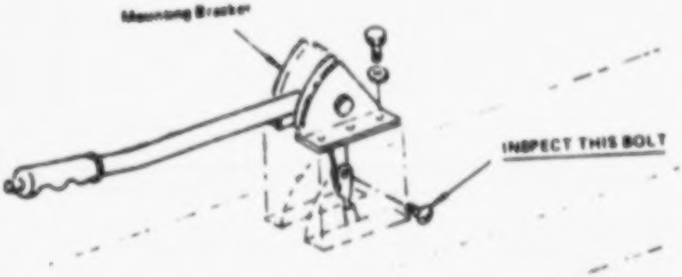
A fire occurred in the left engine during an attempted engine start. Fuel from priming and possibly a leaking fuel line was ignited by an exhaust flash from a damaged stack assembly. Exhaust stains on the outside of the engine cowling indicated a period of operation with the exhaust leak. The submitter suggests that a more thorough preflight inspection may have prevented this fire.

Piper
Model PA-28-161

Clevis Bolt
P/N AN23-10

During a routine inspection, the flap cable attachment bolt to the flap handle was found worn. This condition was found on four separate aircraft with an average time of 545 hours. This subject is covered in Piper Service Letter No. 597; however, the service letter did not include these aircraft. The submitter suggests Piper Service Letter No. 597 be updated to include all Piper PA-28 and PA-32 series aircraft. The service letter recommends inspecting the bolt each 500 hours and replacing it with a new clevis bolt (AN23-11), P/N 400 673, if worn.

NOTE: Above article was published in Alerts No. 90 dated January 1986. There was a recent report of the bolt being found worn over one-third through in a PA-28-140.



Piper
Model PA-28-161

Loose Bolt

The stabilator made a creaking noise when moved by hand during a preflight inspection. Investigation disclosed the balance weight shaft was loose in the stabilator. The aft attach bolt was bent and worn from shear loads. The submitter recommends the bolts be removed and inspected for condition each 1,000 hours of operation.

Piper
Model PA-28-180

Gear Attachment
Screw
P/N AN525-416-20

One of the four upper attachment screws in the left landing gear was found sheared at the last thread grip of the screw. The screwhead and unthreaded portion were seized in the wing and trunnion giving a false appearance of being secure from an exterior inspection. The submitter suggests an interior inspection of each attachment structural screw on PA-28 series aircraft for overtorque and also after hard landings

Piper
Model PA-30

Corroded Bypass
Valve

The fuel selector bypass valve was found corroded to the center tube. The valve would not have moved to bypass the filter had the filter clogged. The submitter suggests the valve be checked for freedom of movement when the filter is removed.

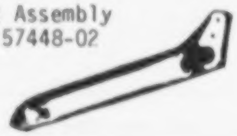
Piper
Model PA-34-220T

Rudder Fitting
P/N 96319-02

The rudder torque tube fitting was found cracked at the bolthole. The submitter advised this was the second cracked fitting recently found on aircraft with around 820 operating hours.

Piper
Model PA-42

Link Assembly
P/N 57448-02



The maingear sidebrace link assembly broke where it fastened to the shaft. The break appeared to have been caused by fatigue and may have been cracked prior to breaking. The submitter recommends inspecting for cracks in this area.

Piper
Model PA-46-310P

Control Column
Support Bearing

The pilot reported stiffness and binding in the elevator control. Inspection disclosed the support bearing mounted in the instrument panel was excessively tight around the control column tube. The submitter suggests inspecting for adequate clearance between the support bearing and the control column tube.

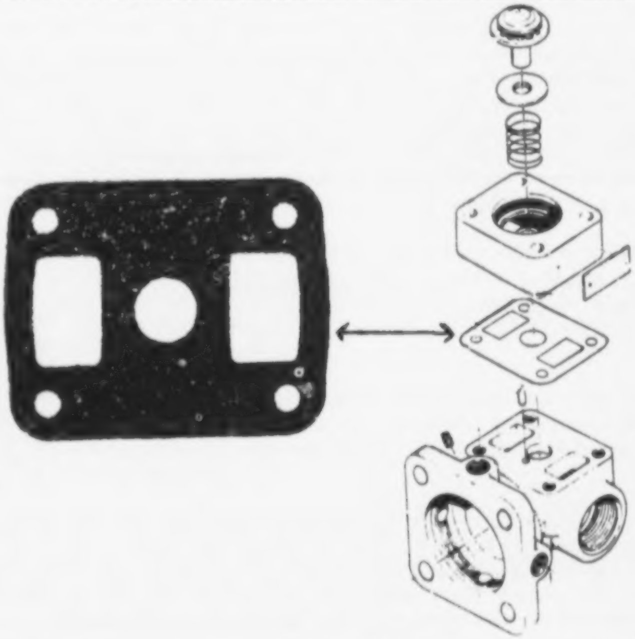
ACCESSORIES

LEAR/ROMEC

Lear/Romec
Engine Driven
Fuel Pump
Model RG9080 Series

Rubber Gasket
P/N RA 8987

The pilot reported higher than normal fuel flow from the left engine on a Piper PA-60-601P. Investigation revealed gasket failure on the high pressure side of the pump with fuel spraying on the engine. This was the third failure of this type gasket observed by one repair station. Because of possible engine fires, the submitter recommends the gasket material be changed to a material that will withstand the internal pump pressures. The submitter also recommends that the gasket and parting surfaces be cleaned with M.E.K. before assembly and that after initial torque values are applied, the valve cover screws be retorqued after 20 minutes because the gasket cold flows causing the original torque values to be lost. Time on this reported pump since new - 146 hours.



TELEDYNE CRITTENDEN

Teledyne Crittenden Alternator	Worn Brushes	The brushes in the 100-amp alternators are wearing away between 300 to 600 hours of operation. One submitter advised that when the brush spring comes out of the holder, the spring wears the slipring. There are no replacement sliprings available, therefore, alternator replacement is required. Submitters advise longer life brushes are needed.

COMMUNICATIONS/NAVIGATION EQUIPMENT

COLLINS

Collins Model IND-270	Weather Radar Indicator	Failures of the IND-270 Weather Radar Indicator have been reported which resulted in smoke in the cockpit. Investigation into these reports identified the problem as a failure in the power supply that can cause the current rating of Regulator Board A9A2 inductors L1 and L2 to be exceeded. This may cause the complete failure of the inductors and possible generation of smoke. Collins has developed Service Bulletin IND-270 SB5 that provides for installation of new inductors having a higher current rating. Operators are encouraged to install these new torodial style inductors as soon as possible to reduce the potential for a failure and possible smoke. Affected Units: CPN 622-5941-0001 S/N 471, 459 and below CPN 622-5941-002 S/N 525 and below

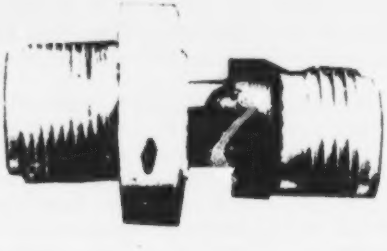
ENGINES

CONTINENTAL

Continental Model IO-470-H	Silicone Sealer	A light blue, automotive-type, silicone sealer was noticed around Nos. 1, 3, and 5 valve cover gaskets during an annual inspection. Removal of the valve covers revealed loose sealer in each cover. While dismantling the engine, the Nos. 1 and 4 rod bearings were found severely scuffed. Silicone sealer was found in the propeller governor screen. This submitter suggests that all aircraft mechanics and owners be made aware that this is not an approved substance for use in aircraft engines. He further suggests that an airworthiness directive be issued regarding the use of the sealer.

PRATT AND WHITNEY

Pratt and Whitney Chip Detector
Model PT6A-28



Oil was observed at the front of the left engine. Investigation disclosed the chip detector plug was broken and hanging by the safety wire. The submitter suspects too much torque was applied during installation of the chip detector. Similar articles were published in Alerts No. 28 dated November 1980, No. 53 dated February 1983, and No. 67 dated February 1984. Pratt and Whitney Service Bulletin No. 1217, Revision No. 4, advises to tighten the chip detector to 45 to 55 pound-inches and secure and tighten the electrical connector to 12 to 16 pound-inches and lockwire.

BE AWARE

BALLOON WORKS FIREFLY-VALVE CORROSION

Corrosion was found on the external brass fittings, and a white powdery substance was noted on the burner coil and valve stem. Investigation disclosed the propane used for the previous 15 to 20 hours had a high concentration of Ethyl Mercaptan. Ethyl Mercaptan has high sulphur content and gives the odor to propane. An indication of propane with a high concentration of Ethyl Mercaptan is a strong odor, high fuel consumption, and a lower b.t.u. output. It was reported that leakage around component fittings is evident by a white powdery substance similar in appearance to battery terminal corrosion.

TURBOCHARGER INTERCOOLER INSTALLATIONS

1. Recent advertisements have presented optimistic claims for the increased aircraft performance to be expected from addition of intercoolers to turbocharged engines. It is, of course, true that the addition of an intercooler can have a significant effect on horsepower output at the same r.p.m. and manifold pressure as nonintercooled installations. However, this can also result in exceeding certificated engine limits over a wide range of operating conditions. Therefore, means of limiting manifold pressure should be part of any approval for an intercooler installation.

2. Assuming, prior to installation of an intercooler, it was possible to attain engine rated limits within published engine settings, then, following the installation, manifold pressure limits should be reduced to avoid exceeding those limits. For instance, an intercooler which reduced intake temperature 100°F would require a 3- to 4-inch reduction in manifold pressure at settings which produced rated horsepower for the nonintercooled engine.

3. If no change to the published engine limits of manifold pressure is presented for an intercooler installation, the user should question what ambient conditions will result in exceeding rated power. The implications for ignoring this is the potential of reduced overhaul periods, possible engine failure, and an affect on engine warranties.

4. Lastly, special care should be exercised in accepting advertising which is presented as actual flight test data from "FAA Certification Flights". At least one case of this recently occurred which in reality did not meet any of the criteria for engineering flight test performance data. In fact, the claimed increase in single engine rate of climb for this case was such that, if it was accurate, the engine rated limits were in all probability exceeded.

MAINTENANCE NOTES

ANTI-ICING SYSTEMS

Aircraft utilizing the isopropyl alcohol windshield deicing system should be inspected to assure the integrity of the system. The inspections should consist of, but not be limited to, the following:

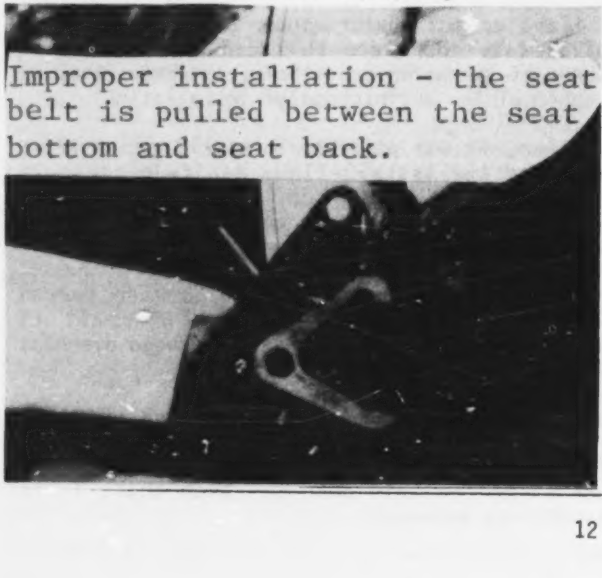
1. Inspect the isopropyl alcohol reservoir for proper attachment and leaks or signs of leakage.
2. Inspect the vent tubing for installation and freedom from obstruction.
3. Inspect the tubing from the alcohol reservoir to the spray nozzles for proper material, leaks or signs of leakage, chafing, kinks, and proper attachment.
4. Inspect the electrically-driven pump for leaks, proper attachment, and operation.
5. The cockpit area above and below the floor should be inspected for possible ignition sources such as chafed electrical wires, exposed relays, etc.
6. All related relays, switches, and circuit breakers should be inspected for condition.
7. The windshield wiper motor and associated electrical wiring should be inspected for condition.
8. The aircraft logbooks should be reviewed for any past history of deicer problems.

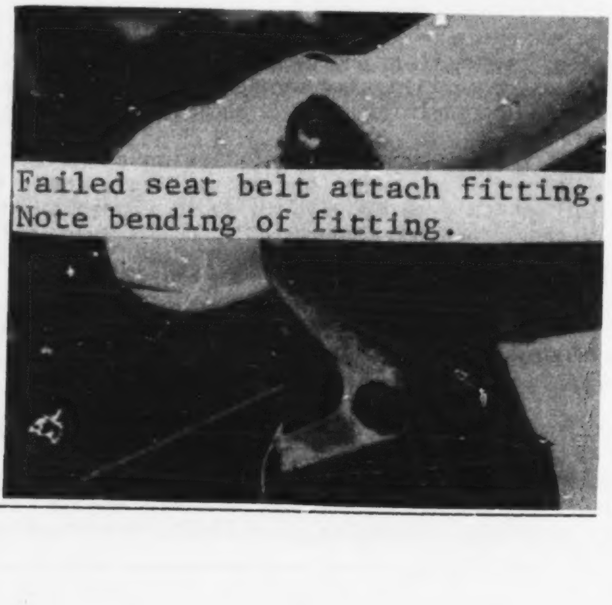
Flight crews should be alerted to the possibility that isopropyl alcohol odor could indicate system leakage and should be reported. The system should be inspected immediately.

SEAT BELT INSTALLATION

In a recent aircraft accident, a 120-pound rear seat passenger was ejected from the aircraft and sustained fatal injuries, while the 250-pound pilot was restrained and received injuries requiring only a brief hospital stay. During the investigation, it was found that the passenger's right seat outboard seat belt attachment fitting was broken and that the fracture had occurred in bending. Part of the fitting remained attached to the seat. The rear edge of the seat, which is used as the seat belt attach point, showed evidence of metallic scraping and paint chip marks which were immediately adjacent to the arms of the seat belt attachment fitting when it was oriented rearward (backward installation). The seat back material adjacent to the fitting exhibited a sharp cut or tear. The seat belt loop also exhibited cut or frayed material. The investigation found that the outboard rear seat belt attachment ring, or fitting, was oriented rearward. The attachment rings are normally oriented forward which result in primarily tension loads when the occupant is subjected to decelerative forces, whereas, the rearward installation would result in primarily bending loads.

All persons installing or changing seat belts using this type of belt fitting, or performing inspections on aircraft with this type of belt attachment fittings, are urged to insure that the fitting or ring is installed properly.


Improper installation - the seat belt is pulled between the seat bottom and seat back.


Failed seat belt attach fitting. Note bending of fitting.

AC OR DC
A LOT RIDING ON RIGHT CHOICE

This article is reprinted by permission from the July 1986 issue of Sport Aerobatics, the magazine of the International Aerobatic Club, a division of the Experimental Aircraft Association.

By Art Bianconi
IAC #5697

Some years ago I was fortunate to be able to work alongside engineers from Underwriters Laboratories (UL) during destructive testing of electrical devices. It was part of my apprenticeship as a designer for a major electrical manufacturer and it was during this period that I acquired an appreciation for the vital differences between AC and DC ratings for switches.

I share this with you because I am growing increasingly concerned at the widespread lack of appropriateness most aircraft builders demonstrate when selecting switches for the cockpit environment. Each time a builder asks me to perform a pre-FAA inspection of the aircraft, I carefully inspect the switches and to date, over three-fourths of the projects inspected have turned up AC-rated or nonrated switches in DC circuits.

There is a large scale misconception that any switch can be used so long as its current rating exceeds the maximum load in the circuit. "Current is current; what difference does it make whether it's DC or AC? Besides, I'm using a 125-volt AC switch in a circuit with only 12-volts!"

The differences in load carrying capability are dramatically non-linear and are best appreciated by carefully inspecting a high-quality switch carrying both AC and DC ratings. Typical of this is the roller and bar micro switch made by MICRO Corporation (part #DT-2RV23-A7). Rated at 10 amps at 125 or 250 volts AC, the same switch can only carry .3 (that's three-tenths!) of an amp at 125 volts DC. If DC voltage is increased to 250 volts, the current rating drops even further to .15 amps! In real terms, this represents less than 1/60 of the original load carrying ability and all we did was go from 250 volts AC to 250 volts DC!

Those of you who can still remember the old Kettering coil ignition systems will recall that when the condenser in the distributor went bad, the points generally turned blue and melted down in just a few minutes. Cockpit switches don't have the benefit of condensers to absorb the electrical inertia present in a DC circuit and, as a result, the gap temperatures get hot enough to weld contacts, even those made with exotic high temperature alloys.

The reason for this is simple enough to appreciate. Because AC current changes directions 120 times a second in a 60-cycle circuit, there are 120 times when there is no current flowing at all. The current actually helps turn itself off the moment it sees a gap and switch designers use this phenomenon to help reduce the cost of manufacturing AC switches. In DC circuits, however, the "push" is constant even when the points begin to open and the resulting arc is DC current's way of demonstrating its resistance to termination.

"But won't my circuit breakers protect me?" No they won't. Fuses and CBs provide overload protection and a welded set of contacts will not, by themselves, cause an increase in circuit load. Furthermore, what often happened during UL testing was that the points welded shut making it impossible to open the circuit. Cycling the switch to the open position was often misleading. Yes, the lever moved, but inside the switch, the cam had separated from the welded points and while it appeared to have interrupted the circuit, the circuit was, in fact, still hot.

If the circuit involved was your fuel transfer pump or fuel boost pump and you thought it turned off when in fact it was still running, what would the consequences be? If it were a flap or elevator trim motor or gear retraction device, how would a tripped circuit breaker save you if the activating switch was welded closed and in a mode other than what is required for a safe landing?

A DC-rated switch will cost you about three times more than an AC-rated switch of identical current capacity. If your panel sports 10 switches (which is not likely), the difference will be less than $35.00 (in 1986 dollars). You've gotten this far. Is it worth jeopardizing your investment or you safety by cutting corners with cheap or improperly rated switches?

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